USDA Natural Resources Conservation Service

Ecological site R044AY502WA
Warm-frigid, Aquic-Xeric, Loamy, Flood Plains (Grass/Sedge) Semi-wet Meadow

Last updated: 9/07/2023
Accessed: 05/17/2024

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.

MLRA notes

Major Land Resource Area (MLRA): 044A–Northern Rocky Mountain Valleys

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Description of MLRAs can be found in: 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.

LRU notes

Major land resource area (MLRA): 044A-Northern Rocky Mountain Valleys
Modal LRU – 44A01 - Spokane-Rathdrum Outwash Plains

This LRU is composed predominantly of low foothills, outwash plains and valley floors. The soils tend to be loamy to sandy andisols, inceptisols, and mollisols with mixed or distinct ash surfaces. Recent alluvium, till, outwash and residuum from granitic or metamorphic rock are the dominant parent materials. Soil climate is a mesic temperature regime and xeric moisture regime with average annual precipitation around 525 mm (21 inches).

Classification relationships

This ES group fits into the National Vegetation Standard's Rocky Mountain-Great Basin Riparian Shrubland Group and is most closely related to Washington State's Natural Heritage Program's Rocky Mountain Alpine-Montane Wet Meadow but occurs at a lower elevation than is typical. (Compare to previous Washington range site: R044XY602WA, Semi-wet meadow 15+ PZ)

Ecological site concept

This ES is found on loamy soils in drainageways with a water table within 30 inches of the surface and a plant community dominated by grasses and forbs and some shrubs.

Associated sites

F043AY518WA	**Warm-Frigid, Xeric, Loamy Slopes, mixed ash surface (Douglas-Fir/Warm Dry Shrub) Pseudotsuga menziesii / Physocarpus malvaceus - Symphoricarpos albus** This site occurs on hillslopes, mountain slopes, and terraces. They have loamy soil materials and lack a high water table. They do not have a distinct volcanic ash mantle and are very deep. Overstory species include Pseudotsuga menziesii var. glauca,and Pinus ponderosa. The understory is typified by Physocarpus malvaceus, Symphoricarpos albus, Calamagrostis rubescens, and Bromus vulgaris.

F043AY521WA	**Warm-Frigid, Moist- Xeric Loamy Foothills/Mountainsides, ashy surface (Grand Fir Warm Dry Shrub) Abies grandis - Pseudotsuga menziesii / Physocarpus malvaceus - Symphoricarpos albus** Found on lower Hill slopes, mountain slopes and terraces. Textures are loamy and sites lack a high water table. The soil surface has a dsitinct layer of volcanic ash material. Overstory species include Abies grandis and Pseudotsuga menziesii var. glauca. The understory is typified by Physocarpus malvaceus,Symphoricarpos albus,Calamagrostis rubescens,and Hieracium albiflorum.
F043AY512WA	**Warm, Xeric, Loamy Mountainsides, ashy surface (Ponderosa Pine/Dry Grass) Pinus ponderosa / Pseudoroegneria spicata , Pinus ponderosa / Festuca idahoensis** This site occurs on very poorly and poorly drained loamy mineral soils in drainageways with a water table within 20 inches of the surface. Site vegetation is dominated by a mix of wetland adapted species including Alnus incana,Salix,Deschampsia cespitosa, and Carex

Similar sites

R044AY501WA	**Mesic, Aquic, Organic Depressions and Seeps** Found on floodplains and seeps at lower, warmer elevations. Confined to depressions and other areas of water accumulation; water table at 0 to 6 inches with mucky surface texture. Site vegetation is dominated by a mix of wetland adapted species including Spiraea, Alnus viridis , Carex, and Sphagnum
R043AY510ID	**Cool-Mesic Aquic Loamy Flood Plains (CAST/CAREX)** Found on floodplains and in drainageways. Water table within 30 inches of the surface for some time during spring and summer. They have loamy surface textures. Found in locations where MLRA 44A transitions to MLRA 43A at valley margins and upper reaches. Site vegetation is typified by Carex and Calamagrostis stricta.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Calamagrostis canadensis* (2) *Galium trifidum*

Physiographic features

Physiographic Features
This ecological site occurs mainly on somewhat poorly drained drainageways in valleys. Parent materials are derived from mixed volcanic ash, loess and alluvium.

Elevation:
Total range = 565 to 730 m
(1,855 to 2,395 feet)
Median = 640 m
(2,100 feet)

Water Table Depth:
50 to 75 cm (median= 56 cm)
(20 to 30 inches; median = 22 inches)

Table 2. Representative physiographic features

Landforms	(1) Valley > Drainageway
Elevation	640 m
Slope	0–4%
Water table depth	56 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Elevation	565–730 m
Slope	0–10%
Water table depth	51–76 cm

Climatic features

Climatic Features

During the spring and summer, a circulation of air around a high-pressure center brings a prevailing westerly and northwesterly flow of comparatively dry, cool and stable air into the region. As the air moves inland, it becomes warmer and drier which results in a dry season beginning in the late spring and reaching a peak in mid-summer. In the fall and winter, a circulation of air around two pressure centers over the ocean brings a prevailing southwesterly and westerly flow of air into the Pacific Northwest. This air from over the ocean is moist and near the temperature of the water. Condensation occurs as the air moves inland over the cooler land and rises along the windward slopes of the mountains or highlands. This results in a wet season beginning in October, reaching a peak in winter, then gradually decreasing in the spring.

The elevation within the LRU varies from approximately 1,500 feet in the lower river valleys to about 3,500 feet on foothills. The annual precipitation increases from 15 inches in the valleys to over 39 inches on higher foothills. Winter season snowfall averages about 43 inches. Both rainfall and snowfall increase with elevation. Snow can be expected after the first of November and to remain on the ground from the first of December until March or April.

In January, the average maximum temperature is near 34° F and the minimum temperature is 23° F. Minimum temperatures from -1° to -20°F are recorded almost every winter and temperatures ranging to -25° F have been recorded. In July, the average maximum temperature is 83° and the minimum temperature 46° F. Maximum temperatures reach 100° F on a few afternoons each summer and temperatures as high as 108° F have been recorded. The average date of the last freezing temperatures can be expected by early-May and after early-October in the warmer areas.
(Compiled from WRCC: Climate of Washington and available station data)

Mean annual precipitation (cm):
Total range = 495 to 725 mm
(20 to 29 inches)
Central tendency = 505 to 595 mm
(20 to 23 inches)

MAAT (C)
Total range = 7.4 to 8.7
(45 to 47 F)
Central tendency = 7.8 to 8.2
(46 to 47 F)

Climate stations: none

Table 4. Representative climatic features

Frost-free period (characteristic range)	120-125 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	508-584 mm
Frost-free period (actual range)	115-130 days
Freeze-free period (actual range)	
Precipitation total (actual range)	508-737 mm

Influencing water features

Water Table Depth:
50 to 75 cm (median= 56 cm)
(20 to 30 inches; median = 22 inches)

Flooding:
Frequency: None
Duration: None
Ponding:
Frequency: None
Duration: None

Soil features

Representative Soil Features

This ecological site is associated with the Colburn series. The soils are Aquandic Haploxerepts. These soils have developed in mixed volcanic ash, loess, and alluvium.

Surface Fragments

Table 5. Representative soil features

Parent material	(1) Volcanic ash (2) Loess (3) Alluvium
Surface texture	(1) Ashy loam
Drainage class	Somewhat poorly drained
Permeability class	Moderate
Depth to restrictive layer	0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.78 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	6.7
Subsurface fragment volume <=3" (25.4-152.4cm)	0–2%
Subsurface fragment volume >3" (25.4-152.4cm)	0%

Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained
Permeability class	Moderate
Depth to restrictive layer	0 cm

Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	9.91–17.78 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	6.1–7.8
Subsurface fragment volume <=3" (25.4-152.4cm)	0–60%
Subsurface fragment volume >3" (25.4-152.4cm)	0–15%

Ecological dynamics

State and transition model

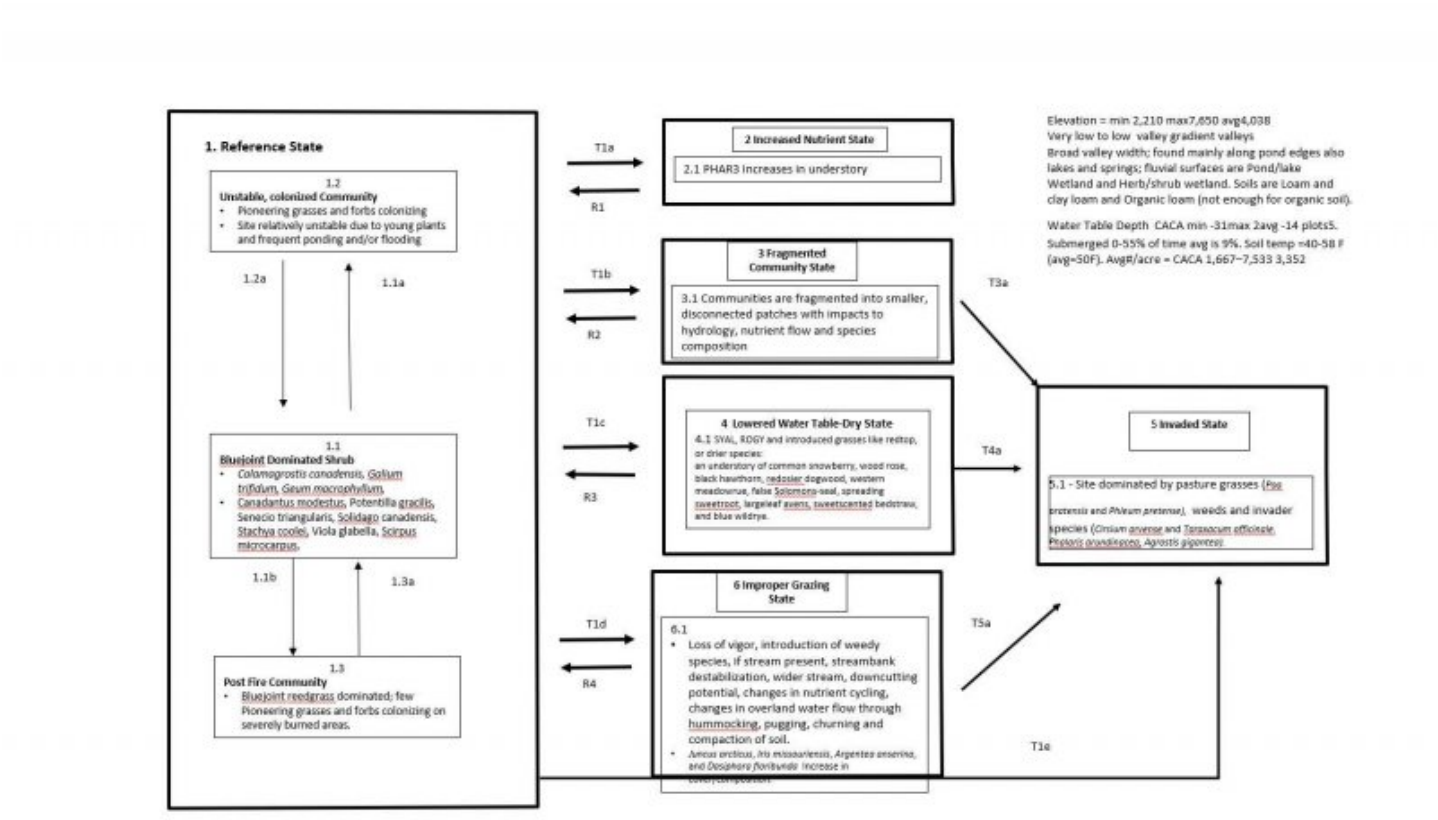
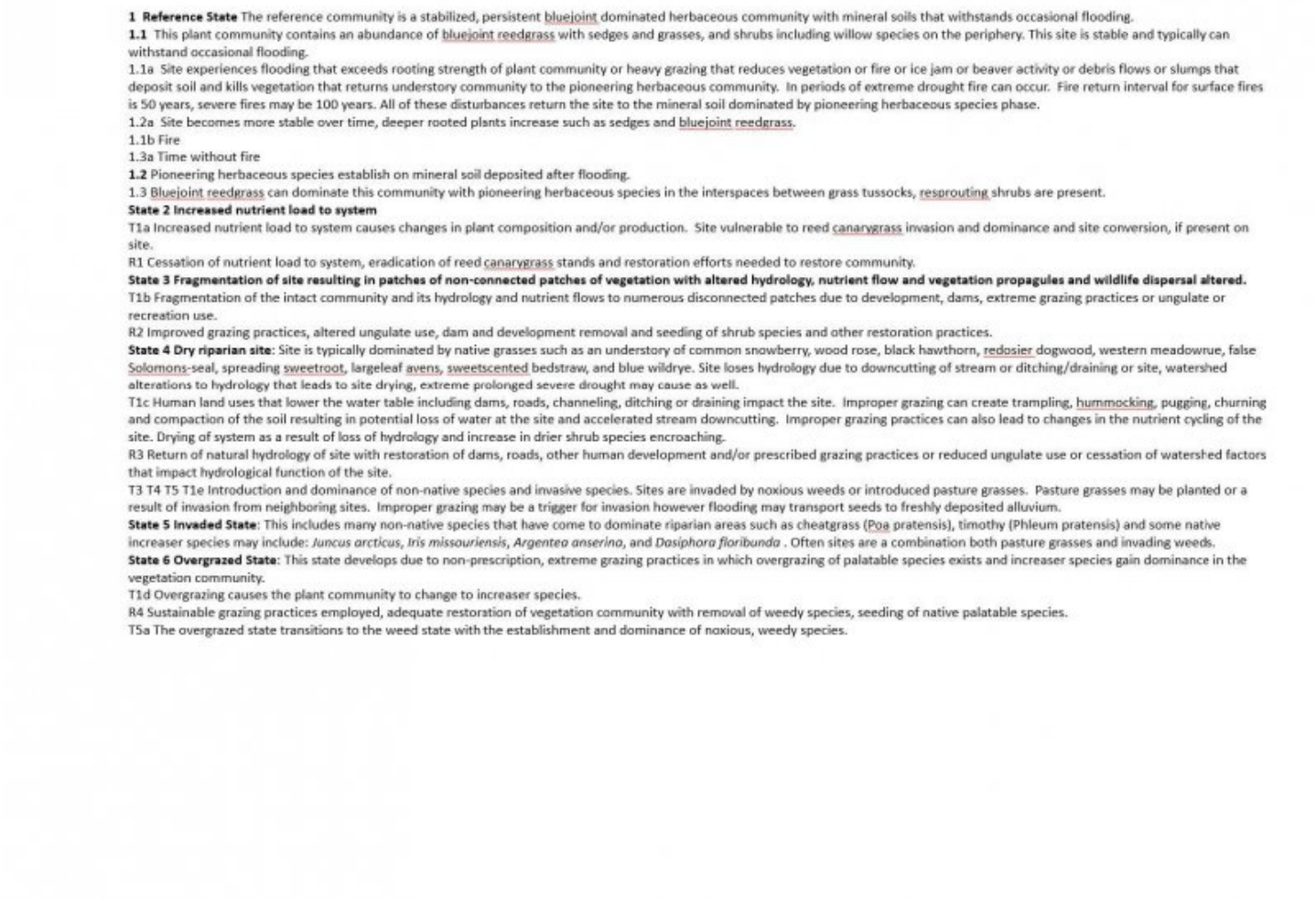


Figure 1. STM



1 Reference State The reference community is a stabilized, persistent bluejoint dominated herbaceous community with mineral soils that withstands occasional flooding.
1.1 This plant community contains an abundance of bluejoint reedgrass with sedges and grasses, and shrubs including willow species on the periphery. This site is stable and typically can withstand occasional flooding.
1.1a Site experiences flooding that exceeds rooting strength of plant community or heavy grazing that reduces vegetation or fire or ice jam or beaver activity or debris flows or slumps that deposit soil and kills vegetation that returns understory community to the pioneering herbaceous community. In periods of extreme drought fire can occur. Fire return interval for surface fires is 50 years, severe fires may be 100 years. All of these disturbances return the site to the mineral soil dominated by pioneering herbaceous species phase.
1.2a Site becomes more stable over time, deeper rooted plants increase such as sedges and bluejoint reedgrass.
1.1b Fire
1.3a Time without fire
1.2 Pioneering herbaceous species establish on mineral soil deposited after flooding.
1.3 Bluejoint reedgrass can dominate this community with pioneering herbaceous species in the interspaces between grass tussocks, resprouting shrubs are present.
State 2 Increased nutrient load to system
T1a Increased nutrient load to system causes changes in plant composition and/or production. Site vulnerable to reed canarygrass invasion and dominance and site conversion, if present on site.
R1 Cessation of nutrient load to system, eradication of reed canarygrass stands and restoration efforts needed to restore community.
State 3 Fragmentation of site resulting in patches of non-connected patches of vegetation with altered hydrology, nutrient flow and vegetation propagules and wildlife dispersal altered.
T1b Fragmentation of the intact community and its hydrology and nutrient flows to numerous disconnected patches due to development, dams, extreme grazing practices or ungulate or recreation use.
R2 Improved grazing practices, altered ungulate use, dam and development removal and seeding of shrub species and other restoration practices.
State 4 Dry riparian site: Site is typically dominated by native grasses such as an understory of common snowberry, wood rose, black hawthorn, redosier dogwood, western meadowrue, false Solomons-seal, spreading sweetroot, largeleaf avens, sweetscented bedstraw, and blue wildrye. Site loses hydrology due to downcutting of stream or ditching/draining or site, watershed alterations to hydrology that leads to site drying, extreme prolonged severe drought may cause as well.
T1c Human land uses that lower the water table including dams, roads, channeling, ditching or draining impact the site. Improper grazing can create trampling, hummocking, pugging, churning and compaction of the soil resulting in potential loss of water at the site and accelerated stream downcutting. Improper grazing practices can also lead to changes in the nutrient cycling of the site. Drying of system as a result of loss of hydrology and increase in drier shrub species encroaching.
R3 Return of natural hydrology of site with restoration of dams, roads, other human development and/or prescribed grazing practices or reduced ungulate use or cessation of watershed factors that impact hydrological function of the site.
T3 T4 T5 T1e Introduction and dominance of non-native species and invasive species. Sites are invaded by noxious weeds or introduced pasture grasses. Pasture grasses may be planted or a result of invasion from neighboring sites. Improper grazing may be a trigger for invasion however flooding may transport seeds to freshly deposited alluvium.
State 5 Invaded State: This includes many non-native species that have come to dominate riparian areas such as cheatgrass (Poa pratensis), timothy (Phleum pratensis) and some native increaser species may include: *Juncus arcticus*, *Iris missouriensis*, *Argentea anserina*, and *Dasiphora floribunda* . Often sites are a combination both pasture grasses and invading weeds.
State 6 Overgrazed State: This state develops due to non-prescription, extreme grazing practices in which overgrazing of palatable species exists and increaser species gain dominance in the vegetation community.
T1d Overgrazing causes the plant community to change to increaser species.
R4 Sustainable grazing practices employed, adequate restoration of vegetation community with removal of weedy species, seeding of native palatable species.
T5a The overgrazed state transitions to the weed state with the establishment and dominance of noxious, weedy species.

Figure 2. Narrative

References

. USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.. USNVC: http://usnvc.org/.

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Rocchio, J.F. and R.C. Crawford. 2015. Ecological systems of Washington State. A guide to identification. Washington Department of Natural Resources.. Natural Heritage Report.. Washington Department of Natural Resources, Natural Heritage Program, Olympia, WA. 1–397.

Contributors

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Approval

Kirt Walstad, 9/07/2023

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	05/17/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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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:**