USDA Natural Resources Conservation Service

Ecological site F145XY003CT
Very Wet Inland Lake Plain

Last updated: 9/27/2024
Accessed: 05/13/2025

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): 145X–Connecticut Valley

Major Land Resource Area (MLRA): 145 – Connecticut Valley (USDA-NRCS, 2006).
The nearly level floor of the Connecticut Valley makes up most of the area. Nearly level to sloping lowlands are at the outer edges of the river valley. These lowlands are broken by isolated, north- to south-trending trap-rock ridges that are hilly and steep. Elevation ranges from sea level to 100 meters (330 feet) in the lowlands and from 50 to 100 meters (650 to 1,000 feet) on ridges. The geology of this rift valley is a late Triassic and early Jurassic sandstone, shale, and conglomerate sequence. Tilted basalt flows along rift zones form the trap rock ridges exhibiting the greatest landscape relief. Glaciation accounts for glacial lake deposits, outwash, and till. Following glacial retreat, wind-deposited loess caps some areas. Recent alluvium deposits form well-developed flood plain along the Connecticut River. These deposits created some of the most productive agricultural soils in New England. The dominant soils are entisols and inceptisols with a mesic temperature regime in combination with parent materials such as glacial lakebeds, glacial outwash, glacial till, and recent alluvium. From north-to-south within the Connecticut Valley, the climate transitions from humid-continental to humid temperate with pronounced seasons and frequent storms. The forests are predominately central hardwoods to the south and transition hardwoods to the north. Significant habitats include trap rock ridges, sandplains, and floodplains of the Connecticut River and major tributaries. Much of the area is currently in residential and urban development and agriculture. While much of the areas is also forested, habitat loss and fragmentation are widespread throughout the Connecticut Valley

Classification relationships

USDA-NRCS (USDA, 2006):
Land Resource Region (LRR): R – Northeastern Forage and Forest Region
Major Land Resource Area (MLRA): 145 – Connecticut Valley

USDA-FS (Cleland et al, 2007):
Province: 221 – Eastern Broadleaf Forest
Section: 221A – Lower New England
Subsection: 221Af –Lower Connecticut River Valley
Province: M211 – Adirondack New England Mixed Forest – Coniferous Forest – Alpine Meadow (in part)
Section: M211B– New England Piedmont (in part)
Subsection: 211Bb – Southern Piedmont (in part)

Ecological site concept

The Ver Wet Inland Lake Plain ecological site consists of deep, very poorly drained silty clayey soils formed in glacio-lacustrine sediments and occupy bottomlands and basins. Geographically, these areas were once occupied by former glacial Lake Hitchcock in MA and northcentral CT, as well other former glacial lakes within the CT valley. Representative soil is Maybid derived from inland glaciolacustrine parent materials. The vegetation is often a mosaic of forest, woodland, shrub land, and herbaceous communities. The reference forest community is typified by

a red maple – hardwoods swamp forest. These sites may be influenced by seasonal flooding and high water tables or seepage and maybe considered minerotrophic (slightly enriched).

Associated sites

F145XY004CT	**Wet Lake Plain**

Similar sites

F145XY006CT	**Semi-Rich Moist Lake Plain**
F145XY007MA	**Well Drained Lake Plain**

Table 1. Dominant plant species

Tree	(1) *Acer rubrum* (2) *Nyssa sylvatica*
Shrub	(1) *Vaccinium corymbosum* (2) *Rhododendron viscosum*
Herbaceous	(1) *Symplocarpus foetidus* (2) *Dulichium arundinaceum*

Physiographic features

The site consists occurs as nearly level depressions in lake plain landscapes. Frequent to occasional ponding occurs October-May.

Table 2. Representative physiographic features

Landforms	(1) Lake plain > Depression
Runoff class	Negligible to low
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	1–366 m
Slope	0–3%
Ponding depth	0–15 cm
Water table depth	8 cm
Aspect	Aspect is not a significant factor

Climatic features

The regional climate of the Connecticut Valley transitions north to south, from humid-continental to humid temperate, respectively, with pronounced seasons and frequent storms. (Beck et al., 2018; Bailey, 2014).

Climate change is occurring, and the resiliency of any ecological site will depend upon the direct and indirect effects upon component species and shifting atmospheric and soil conditions. On these ecological sites, wetland forests are at a moderate vulnerability risk to climate change with impacts considered both negative and positive. Warmer seasonal temperatures and a prolonged growing season will be beneficial for increasing wetland forest productivity. However, climate extremes may introduce earlier leaf phenologies susceptible to frost damage and general plant weakening. Although wetland forests are adapted to seasonal changes in hydrology, more intense and catastrophic storms (wind, rain, ice) may increase the frequency of canopy gaps, amplify the effects of insect pests, and introduced species. Several invasive species will continue o be a threat. (Janowiak et al, 2018).

Table 3. Representative climatic features

Frost-free period (characteristic range)	121-141 days
Freeze-free period (characteristic range)	156-182 days
Precipitation total (characteristic range)	1,168-1,245 mm
Frost-free period (actual range)	112-142 days
Freeze-free period (actual range)	146-185 days
Precipitation total (actual range)	1,168-1,295 mm
Frost-free period (average)	130 days
Freeze-free period (average)	168 days
Precipitation total (average)	1,219 mm

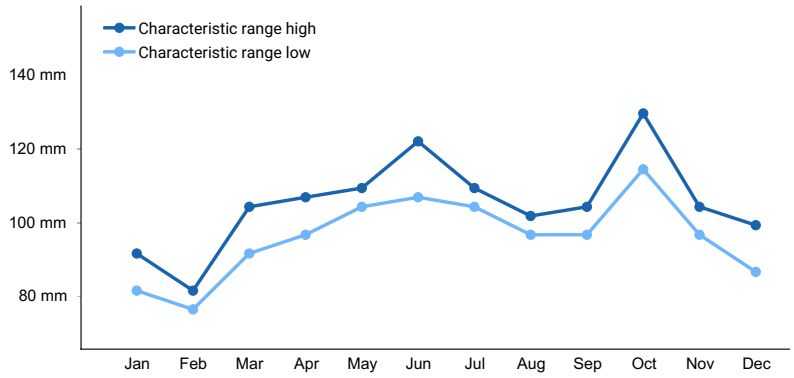


Figure 1. Monthly precipitation range

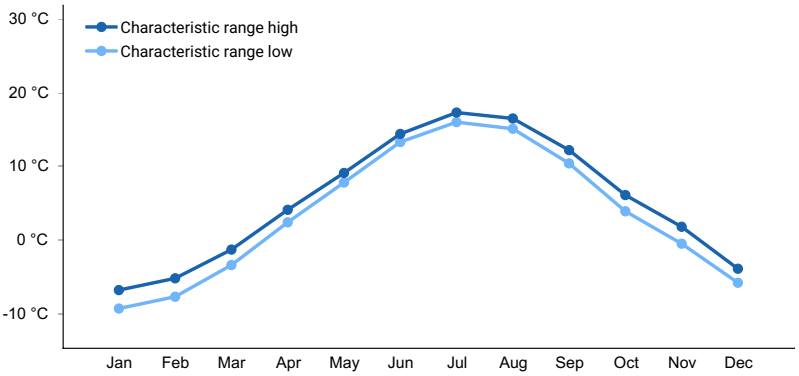


Figure 2. Monthly minimum temperature range

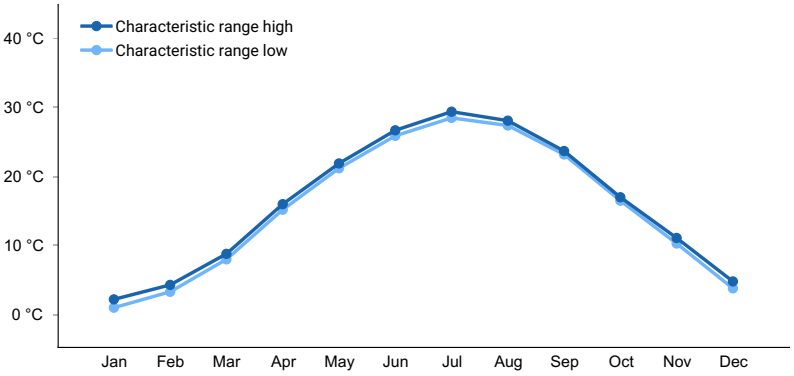


Figure 3. Monthly maximum temperature range

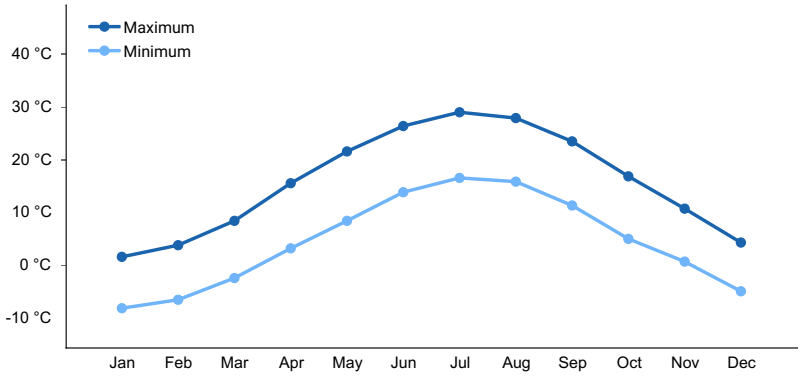


Figure 4. Monthly average minimum and maximum temperature

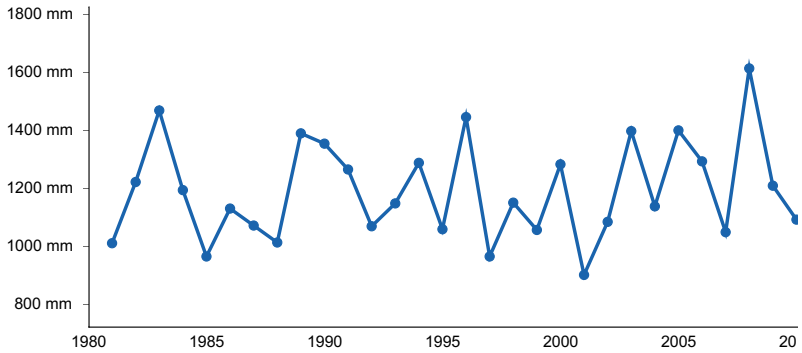


Figure 5. Annual precipitation pattern

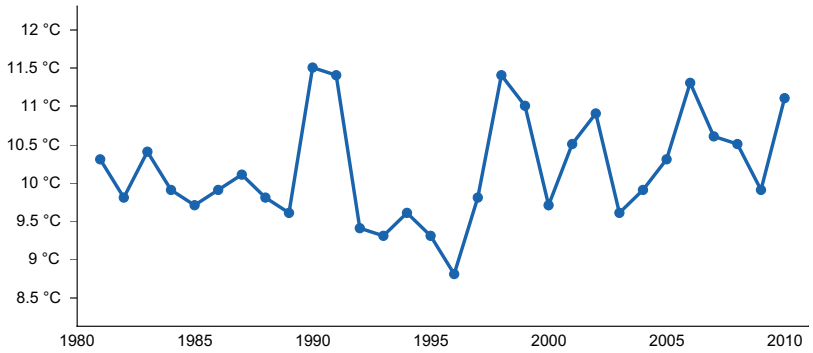


Figure 6. Annual average temperature pattern

Climate stations used

- (1) HARTFORD BRADLEY INTL AP [USW00014740], Suffield, CT
- (2) MIDDLETOWN 4 W [USC00064767], Middlefield, CT
- (3) AMHERST [USC00190120], Amherst, MA

Influencing water features

Very poorly drained
Water is removed from the soil so slowly that free water remains at or very near the surface during much of the growing season. Internal free water occurrence is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. In areas where rainfall is high or nearly continuous, slope gradients may be greater.

Wetland description

National Wetland Classification (Cowardin et al., 1979):

Palustrine, class variable, leaf morphology variable, water regime variable, chemistry modifier variable.

Soil features

The site consists of very deep and very poorly drained soils that formed in fine textured glaciolacustrine sediments. Content of rock fragments is usually less than 1 percent by volume. The soil ranges from strongly acid to moderately acid in the A horizon and from strongly acid to neutral in the B and C horizons. Permeability is slow or very slow. Saturated hydraulic conductivity is moderately high or high in the surface layer very low to moderately high in the subsoil and substratum. The soil is intermittently ponded or has very low runoff.

The representative soil map unit component is Maybid that is derived from lacustrine sediments rather than marine sediments.

Table 4. Representative soil features

Parent material	(1) Glaciolacustrine deposits–granite and gneiss
Surface texture	(1) Silt loam
Family particle size	(1) Fine
Drainage class	Very poorly drained
Depth to restrictive layer	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, not yet validated with 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). Terrestrial ecological SYSTEMS are specifically defined as a group of plant community-types called ASSOCIATIONS that tend to [co-]occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. Any given system will typically manifest itself in a landscape at intermediate geographic scales of tens-to-thousands of hectares and will persist for 50 or more years. A vegetation association is a plant community that is much more specific to a given soil, geology, landform, climate, hydrology, and disturbance history. It is the basic unit for vegetation classification and recognized by the US National Vegetation Classification (US FDGC 2008). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (tree, sapling, shrub, and herb). Within the NatureServe Explorer database (NatureServe, 2015), ecological systems are numbered by a Community Ecological System Code (CES) and individual vegetation associations are assigned an identification number called a Community Element Global Code (CEGL).

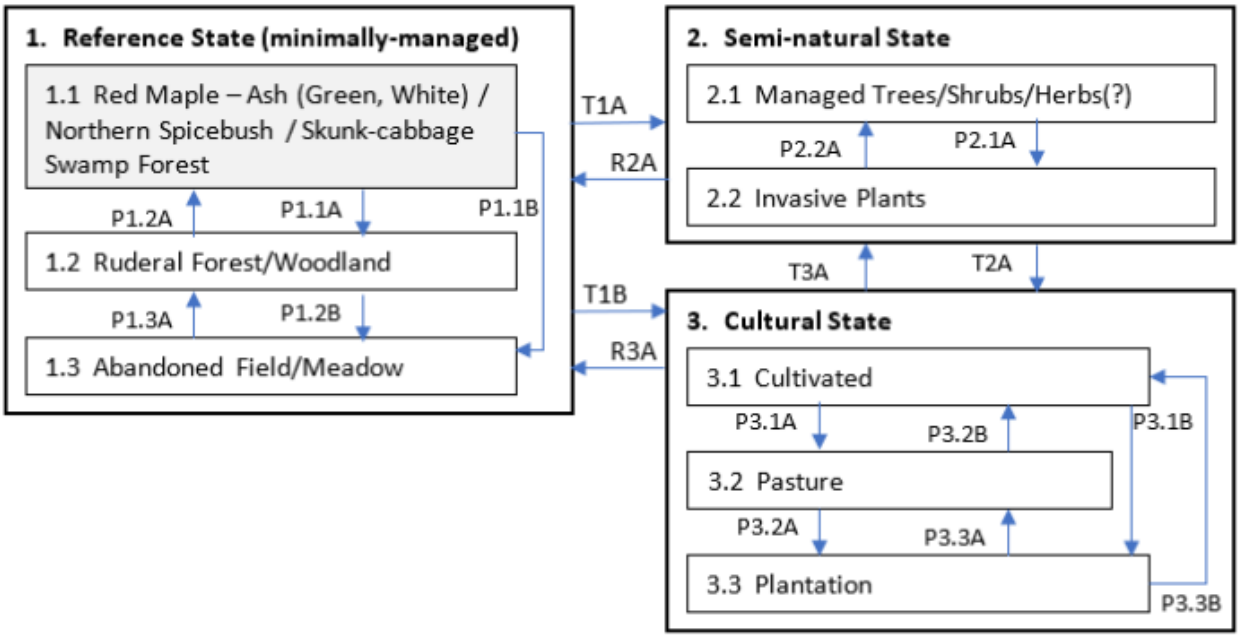
Additional and more localized vegetation information can be provided by the various State Heritage Programs. Additional insights to the vegetation were provided by: "The Vegetation of Connecticut: A Preliminary Classification" (Metzler and Barrett, 2006), "Classification of the Natural Communities of Massachusetts" (Swain 2020), "Wetland, Woodland, Wildland" (Thompson and Sorenson 2000), and "Natural Communities of New Hampshire, 2nd Ed." (Spurduto and Nichols, 2011).

The Very Wet Coastal Lake Plain ecological site is characteristic of the North-Central Appalachian Acidic Swamp system (CES202.604). The vegetation is often a mosaic of forest, woodland, shrub land, and herbaceous communities. The reference community is typified by red maple – hardwood swamp occasionally with a patchy canopy. Alteration of the natural hydrological regime (diversions, culverts, impoundments) can be a threat. Fires are typically suppressed, and otherwise less common in these wet lake plain environments compared to drier upland environments. Windthrows are common. Invasive species, such as common reedgrass (*Phragmites australis* ssp. australis), purple loosetrife (*Lythrum salicaria*), and occasionally multiflora rose (*Rosa multiflora*), non-native honeysuckles (Lonicera spp., Japanese stiltgrass (*Microstegium vimineum*), Japanese knotweed (Fallopia japonica), and barberry (*Berberis thunbergii*) may produce a state change. The most significant threat is the emerald ash borer (Agrilus planipennis), an Asian beetle that infests and kills North American ash trees.

Other ecological states, a Semi-natural State and a Cultural State are recognized. The Semi-natural State would expect plant communities where ecological processes primarily operate with some conditioning by land management, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants. The Cultural State is a completely converted or transformed state heavily or completely conditioned by land management, e.g., cultivated lands, pasture/haylands, vineyards, and plantations, etc. Generally, the form of vegetation in the Semi-natural State or the Cultural State is not able to be specified until field work is conducted.

State and transition model

145XY003 – Very Wet Inland Lake Plain



Transition	*Drivers/practices*
T1A	Forest mgmt., Disturbance
T1B, T2A	Disturbance/cutting/clearing, Brush removal
R2A, R3A	Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment
T3A	Abandonment, Plant establishment, Forest mgmt.
P2.1A	Disturbance, Invasive species establishment
P2.2A	Invasive spp. Control, Forest mgmt..
P1.3A, P1.2A	Abandonment, succession
P3.1A, P3.2A, P3.3A, P3.1B, P3.2B, P3.3B	Changing agricultural phases
P1.1A, P1.1B, P1.2B	Disturbance, Early Successional Habitat Development

State 1
Reference state minimally-managed)

Note: The reference plant communities for this ecological site is highly variable: • Southern New England-Northern Piedmont Red Maple Seepage Swamp Forest (CEGL006406) *Acer rubrum* - Fraxinus (pennsylvanica, americana) / *Lindera benzoin* / *Symplocarpus foetidus* Swamp Forest (Translated) Red Maple - (Green Ash, White Ash) / Northern Spicebush / Skunk-cabbage Swamp Forest Other plant communities may occur: • Red Maple- Blackgum Basin Swamp Forest *Acer rubrum* - *Nyssa sylvatica* - *Betula alleghaniensis* / Sphagnum spp. Swamp Forest (Translated) Red Maple - Blackgum - Yellow Birch / Peatmoss species Swamp Forest • Northeast Red Maple Acidic Swamp Forest (CEGL006220) *Acer rubrum* / *Ilex mucronata* - *Vaccinium corymbosum* Swamp Forest (Translated) Red Maple / Mountain Holly - Highbush Blueberry Swamp Forest • Lower New England Red Maple Swamp Forest (CEGL006156) *Acer rubrum* / *Rhododendron viscosum* - *Clethra alnifolia* Swamp Forest (Translated) Red Maple / Swamp Azalea - Coastal Sweet-pepperbush Swamp Forest • Southern New England Threeway Sedge Fen (CEGL006131) *Dulichium arundinaceum* / Sphagnum spp. Fen (Translated) Threeway Sedge / Peatmoss species Fen • Eastern Cattail Marsh (CEGL006153) Typha (angustifolia, latifolia) - (Schoenoplectus

spp.) Eastern Marsh (Translated) Narrowleaf Cattail, Broadleaf Cattail) - (Bulrush species) Eastern Marsh A local variant plant community may be found: • Silky Willow Shrub Swamp (CEGL006305) *Salix sericea* Shrub Swamp (Translated) Silky Willow Shrub Swamp

Community 1.1
Southern New England-Northern Piedmont Red Maple Seepage Swamp Forest (CEGL006406)

Southern New England-Northern Piedmont Red Maple Seepage Swamp Forest (CEGL006406) *Acer rubrum* - Fraxinus (pennsylvanica, americana) / *Lindera benzoin* / *Symplocarpus foetidus* Swamp Forest (Translated) Red Maple - (Green Ash, White Ash) / Northern Spicebush / Skunk-cabbage Swamp Forest The reference community is typified by a red maple – hardwoods swamp forest. These communities may be perched or show seepage and maybe considered minerotrophic (slightly enriched). Canopy dominants include red maple (*Acer rubrum*) with green ash (*Fraxinus pennsylvanica*) or white ash (*Fraxinus americana*). Other trees include pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*) and black gum (*Nyssa sylvatica*). Shrubs density varies with openness and hydrology. Shrubs include northern spicebush (*Lindera benzoin*) and winterberry holly (Ilex verticillate), silky dogwood (*Cornus amomum*) and northern arrowwood (*Viburnum dentatum* var lucidum). Groundcover is variable w/ skunk cabbage (*Symplocarpus foetidus*)and and/or ferns: cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), marsh fern (Thelypteris palustrius); and sedges: Gray's sedge (*Carex grayi*) , fringed sedge (Carex crinata), hop sedge (*Carex lupulina*). Depending on the water table fluctuations, the "perched" wetlands may contain a more diverse shrub layer. (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]).

State 2
Semi-Natural State

The Semi-natural State would expect plant communities where ecological processes are primarily operating with some land conditioning in the past or present, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants.

Community 2.1
Managed Forest/Woodland [vegetation]

Community 2.2
Invasive Plants

European Buckthorn Purple Loosestrife Reed Canarygrass

State 3
Cultural State

The Cultural State would expect the ecological site to be very strongly conditioned by land management conversion, by transformation to Cultivated/Pasture/Plantation.

Community 3.1
Cultivated

Community 3.2
Pasture

Community 3.3
Plantation

Transition T1A
State 1 to 2

Disturbance, invasive species

Transition T1B
State 1 to 3

Disturbance/cutting/clearing, Brush removal

Restoration pathway R2A
State 2 to 1

Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment

Transition T2A
State 2 to 3

Disturbance/cutting/clearing, Brush removal

Restoration pathway R3A
State 3 to 1

Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment

Transition T3A
State 3 to 2

Abandonment, Plant establishment, Forest mgmt.

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.

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Contributors

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Approval

Nels Barrett, 9/27/2024

Acknowledgments

Michael Margo and tech team assisted w/drafts.

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	05/13/2025
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 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:**