Ecological site R236XY144AK
Subarctic Scrub Peat Terraces

Last updated: 2/13/2024
Accessed: 04/28/2024

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): 236X–Bristol Bay-Northern Alaska Peninsula Lowlands

The Bristol Bay-Northern Alaska Peninsula Lowland Major Land Resource Area (MLRA 236) is located in Western Alaska. This MLRA covers approximately 19,500 square miles and is defined by an expanse of nearly level to rolling lowlands, uplands and low to moderate hills bordered by long, mountain footslopes. Major rivers include the Egegik, Mulchatna, Naknek, Nushagak, and Wood River. MLRA 236 is in the zone of discontinuous permafrost. It is primarily in areas with finer textured soils on terraces, rolling uplands and footslopes. This MLRA was glaciated during the early to middle Pleistocene. Moraine and glaciofluvial deposits cover around sixty percent of the MLRA. Alluvium and coastal deposits make up a large portion of the remaining area (Kautz et al., 2012; USDA, 2006).

Climate patterns across this MLRA shift as one moves away from the coast. A maritime climate is prominent along the coast, while continental weather, commonly associated with Interior Alaska, is more influential inland. Across the MLRA, summers are general short and warm while winters are long and cold. Mean annual precipitation is 13 to 50 inches, with increased precipitation at higher elevations and areas away from the coast. Mean annual temperatures is between 30 and 36 degrees F (USDA, 2006).

The Bristol Bay-Northern Alaska Peninsula MLRA is principally undeveloped wilderness. Federally managed land includes parts of the Katmai and Aniakchak National Parks, and the Alaska Peninsula, Becharof, Togiak and Alaska Maritime National Wildlife Refuges. The MLRA is sparsely populated. Principal communities include Dillingham, Naknek, and King Salmon. Commercial fishing in Bristol Bay and the Bering Sea comprises a major part of economic activity in the MLRA. Other land uses include subsistence activities (fishing, hunting, and gathering) and sport hunting and fishing (USDA, 2006).

Classification relationships

Alaska Vegetation Classification:
Open low scrubland (II.C.2 - level III) / Black spruce woodland (II.C.2.j - level IV)
(Viereck et al., 1992)

Ecological site concept

This ecological site is on wet flood plain terrace treads and associated depressions. Slopes are linear to concave with nearly level gradients (0 – 1 percent). Soils are wet with a water table present at the soil surface throughout the year. Soil hydrology, soil pH, and site topography shape the vegetation on this landform. Soils are very poorly drained and pond, due to slope concavity increasing water run in. Low soil acidity keeps nutrient availability low, further restricting plant life.

The reference state supports two communities. The reference plant community is characterized as an open low scrubland (Viereck et al., 1992). It is comprised of facultative to wetland shrub species, with hydrophytic forbs, graminoids, and Sphagnum moss throughout. The second community found here is a mesic graminoid herbaceous

meadow that is most commonly associated with low spots in depression centers.

Associated sites

F236XY176AK	**Boreal Woodland Loamy Flood Plains** F236XY176AK describes forested flood plain talfs. The vegetation on that site is distinctly different from the facultative wet to obligate wetland species supported in R236XY144AK.
R236XY156AK	**Subarctic Ericaceous Scrub Loamy Terraces** Both sites describe terrace treads. R236XY156AK is associated with moderately well drained soils that rarely pond. Aquic conditions are deep in the soil profile. The vegetation on that soil are less hydrophytic than that associated with the very poorly drained and frequently ponded soil on R236XY144AK.
R236XY173AK	**Subarctic Riparian Complex Loamy Flood Plains** R236XY173AK describes occasionally flooded flood plains. These areas are usually lower in elevation and closer to the flood source than R236XY144AK. Differences in hydrology on these sites is noted in the vegetation.

Similar sites

R236XY156AK	**Subarctic Ericaceous Scrub Loamy Terraces** Both are terrace tread sites. R236XY144AK is associated with wetter soils, which is reflected in the vegetation. Drier ecotonal areas may support more of the shrubs that define the reference plant community of R236XY156AK.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Betula nana* (2) *Myrica gale*
Herbaceous	(1) *Carex chordorrhiza* (2) *Carex pluriflora*

Physiographic features

This site is on linear valley terrace treads. This site includes associated concave depressions on these treads. Elevation ranges from 10 to 550 feet above sea level. Slopes are nearly level (0 – 1 percent). Ponding is occasional to frequent and brief to long, depending on slope shape. Flooding does not occur on these terraces. This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Slope shape across	(1) Linear
Slope shape up-down	(1) Linear (2) Concave
Landforms	(1) Valley > Terrace (2) Valley > Terrace
Runoff class	Negligible to medium
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	10–550 ft
Slope	0–1%
Water table depth	0 in

Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to medium
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	10–980 ft
Slope	0–5%
Water table depth	0 in

Climatic features

The climate of this site reflects that of the MLRA, which is described as maritime polar (EPA, 2013). Temperatures are moderated by the nearby Bristol Bay and norther Pacific bodies of water. Annual precipitation ranges from 21 – 34 inches with approximately 40 percent occurring during the June-September growing season (PRISM, 2018).

Table 4. Representative climatic features

Frost-free period (characteristic range)	75-100 days
Freeze-free period (characteristic range)	65-90 days
Precipitation total (characteristic range)	21-34 in
Frost-free period (actual range)	75-100 days
Freeze-free period (actual range)	65-90 days
Precipitation total (actual range)	15-41 in
Frost-free period (average)	90 days
Freeze-free period (average)	75 days
Precipitation total (average)	29 in

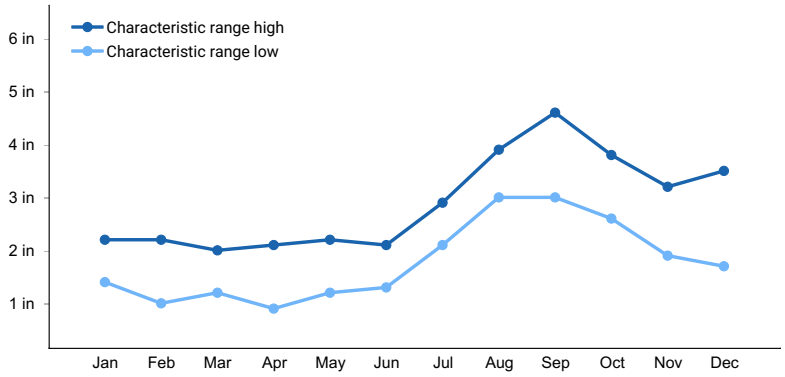


Figure 1. Monthly precipitation range

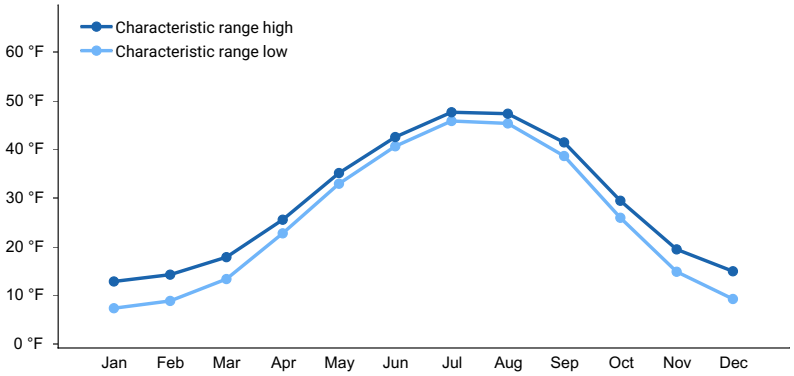


Figure 2. Monthly minimum temperature range

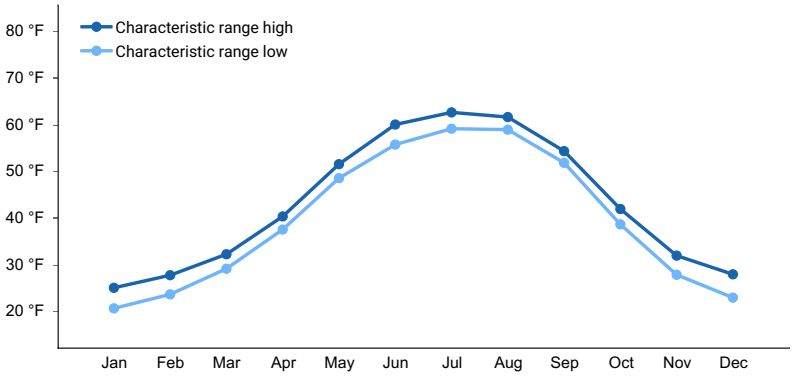


Figure 3. Monthly maximum temperature range

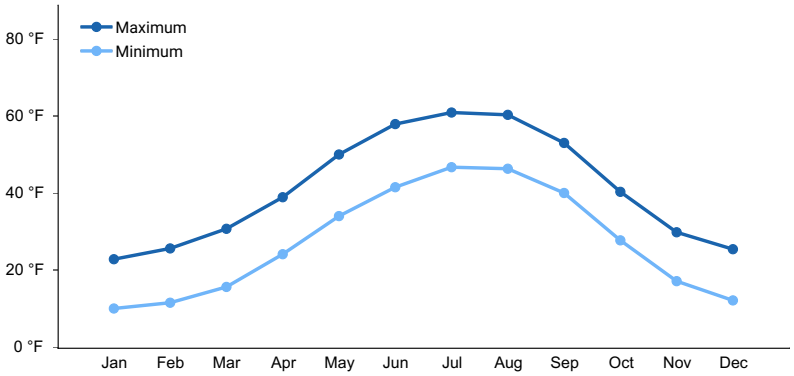


Figure 4. Monthly average minimum and maximum temperature

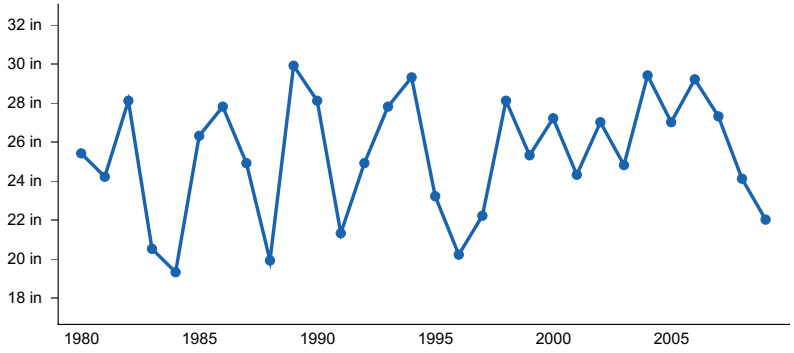


Figure 5. Annual precipitation pattern

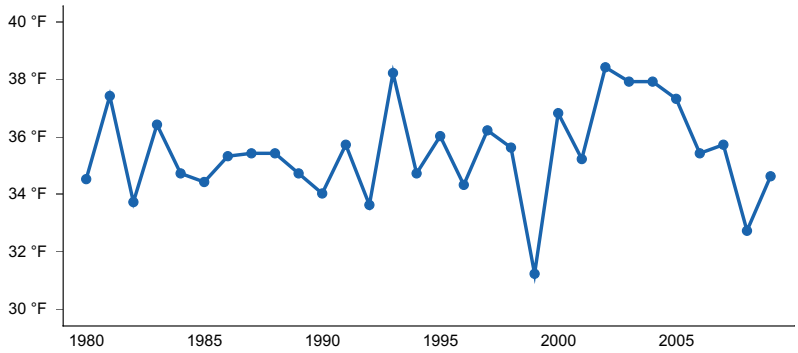


Figure 6. Annual average temperature pattern

Influencing water features

This site is not part of the active flood plain and it is not influenced by riparian water features. Ponding in concave areas increases hydrologic pressures on the vegetation and a distinct community is recognized in terrace depressions. Precipitation, seasonal snow melt, and in flow from higher slope positions are the main sources of water.

Soil features

Associated soils are organic Histosols or young Inceptisols (Soil Survey Staff, 2013). Soils are very deep and very poorly drained. They support a cryic temperature regime and an aquic or peraquic moisture regime. Parent material is mossy organic material over alluvium.

Soil characteristics affecting vegetation include soil hydrology, low soil pH, and relatively low soil fertility. Aquic soil conditions and a year-round shallow water table greatly influence extant vegetation on this site, particularly in depressions. Anaerobic soil conditions exist at moderately deep to deep depths and can limit plant productivity. Extreme to moderate soil pH limits the species that reproduce here. Low soil fertility, as evidence by an umbric epipedon, further restricts plant species on this site.

Correlated soil components in MLRA 236: Orgter, D36-Western maritime scrub organic terraces, D36-Western maritime sedge organic terraces, Histic Cryaquepts

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Organic material
Surface texture	(1) Peat
Drainage class	Very poorly drained
Permeability class	Very slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	3–5.9 in
Soil reaction (1:1 water) (0-10in)	3.9–5.5
Subsurface fragment volume <=3" (Depth not specified)	0–19%
Subsurface fragment volume >3" (Depth not specified)	0%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained
Permeability class	Very slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	3–5.9 in
Soil reaction (1:1 water) (0-10in)	3.9–6
Subsurface fragment volume <=3" (Depth not specified)	0–19%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is associated with wet, very poorly drained soils on flood plain terraces. Local site factors, including slope shape and soil hydrology, shape two co-occurring vegetative communities. The reference plant community is an open low scrubland of facultative wet to obligate wetland species. Terrace depressions occur as a matrix pattern on this site and usually support a mesic graminoid herbaceous meadow (Viereck et al., 1992).

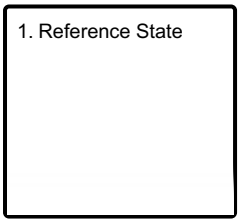
Spatial patterns in soil and site hydrology create two communities. A surface water table is present throughout. Linear talf positions undergo occasional, brief ponding and support a deep (59-72 inches) reduced matrix. Vegetation is a mix of facultative to obligate wetland species, depending on local site characteristics. Concave depressions are wetter, with long periods of frequently ponding, aquic soil conditions at the soil surface, and a shallow (18 inches) reduced matrix. Vegetation is restricted to facultative wet and obligate wetland species and may present as an emergent wetland community, especially at depression centers.

Willows are slightly to moderately browsed by moose. This does not appear to affect the ecological processes of the site. There is no evidence of wildfire on this wet site.

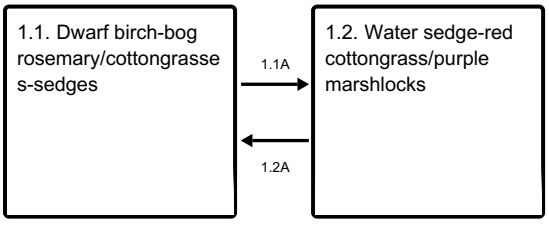
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1A - Increased hydrologic stresssors

1.2A - Decreased hydrologic stressors

State 1
Reference State

The reference state supports two community phases, which are distinguished by the developed structure and dominance of the vegetation and by their ecological function and stability. The reference community phase is hydrophilic scrubland. The presence of each community is dictated temporally by ponding associated with the lowland terraces. This report provides baseline inventory data for the vegetation in this ecological site. Future data collection is needed to provide further information about existing plant communities and the disturbance regime that results in transitions from one community to another. Common and scientific names are from the USDA PLANTS database. Community phases are characterized by the Alaska Vegetation Classification System (Viereck et al., 1992).

Community 1.1
Dwarf birch-bog rosemary/cottongrasses-sedges

Figure 7. Typical area of community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation data is aggregated across modal sample plots for this community phase and is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
S	Dwarf birch	*Betula nana*	BENA	100	15
S	Marsh Labrador tea	*Ledum palustre* ssp. *decumbens*	LEPAD	82	9
S	Bog rosemary	*Andromeda polifolia*	ANPO	82	4
S	Bog blueberry	*Vaccinium uliginosum*	VAUL	75	8
S	Bog cranberry	*Vaccinium oxycoccos*	VAOX	68	1
S	Sweetgale	*Myrica gale*	MYGA	53	15
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	50	8
G	Water sedge	*Carex aquatilis*	CAAQ	43	8
F	Purple marshlocks	*Comarum palustre*	COPA28	50	7
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2*	86	80

Sphagnum mosses are identified at the genus level.

The sample plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 8. Frequency and canopy cover of plants in community 1.1.

The reference plant community phase is open low scrubland (Viereck et al., 1992). It consists of dwarf birch (*Betula nana*), bog blueberry (*Vaccinium uliginosum*), sweetgale (*Myrica gale*), and bog rosemary (*Andromeda polifolia*) interspersed with various sedges (Carex spp.) and cottongrasses (Eriophorum spp.). The richness of the graminoids is high. They may include red cottongrass (*Eriophorum russeolum*), tussock cottongrass (*E. vaginatum*), white cottongrass (*E. scheuchzeri*), creeping sedge (*Carex chordorrhiza*), water sedge (*C. aquatilis*), manyflower sedge (*C. pluriflora*), and bluejoint (*Calamagrostis canadensis*). Other extant species include purple marshlocks (*Comarum palustre*), hooded lady's tresses (*Spiranthes romanzoffiana*), black crowberry (*Empetrum nigrum*), Alaska bog willow (*Salix fuscescens*), and bog cranberry (*Vaccinium oxycoccos*). Mosses, particularly sphagnum mosses (Sphagnum spp.), are prevalent in the ground cover, and lichens are a minor component. Other ground

cover includes herbaceous litter, woody litter, and water. Some areas are bare soil.

Dominant plant species

- dwarf birch (*Betula nana*), shrub
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- bog rosemary (*Andromeda polifolia*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- small cranberry (*Vaccinium oxycoccos*), shrub
- sweetgale (*Myrica gale*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- water sedge (*Carex aquatilis*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous
- sphagnum (*Sphagnum*), other herbaceous

Community 1.2
Water sedge-red cottongrass/purple marshlocks

Figure 9. Typical area of community 1.2.

Community Phase 1.2 Canopy Cover Table

Vegetation data is aggregated across modal sample plots for this community phase and is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
S	Dwarf birch	*Betula nana*	BENA	89	2
S	Bog cranberry	*Vaccinium oxycoccos*	VAOX	78	2
S	Alaska bog willow	*Salix fuscescens*	SAFU	56	2
G	Water sedge	*Carex aquatilis*	CAAQ	89	25
G	Red cottongrass	*Eriophorum russeolum*	ERRU2	56	9
G	Creeping sedge	*Carex chordorrhiza*	CACH5	33	30
F	Purple marshlocks	*Comarum palustre*	COPA28	56	30
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2 #	89	85

Sphagnum mosses are identified at the genus level.

The sample plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

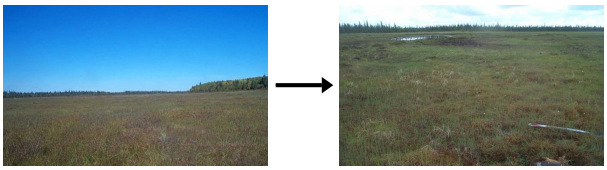
Figure 10. Frequency and canopy cover of plants in community 1.2.

The early ponding community phase is a wet graminoid herbaceous meadow (Viereck et al., 1992). It consists of facultative wetland and obligate wetland graminoids with some hydrophilic shrubs throughout. Common graminoids include water sedge, creeping sedge, looseflower alpine sedge (*Carex rariflora*), red cottongrass, and white cottongrass. Common shrubs include dwarf birch, Alaska bog willow, and bog cranberry. Other extant species may include purple marshlocks (*Comarum palustre*), various sedges and cottongrasses, water horsetail (*Equisetum fluviatile*), and roundleaf sundew (*Drosera rotundifolia*). Mosses, particularly sphagnum mosses, are a major component of the ground cover. Other ground cover includes herbaceous litter, water, and lichens. Some areas are bare soil.

Dominant plant species

- dwarf birch (*Betula nana*), shrub
- small cranberry (*Vaccinium oxycoccos*), shrub
- Alaska bog willow (*Salix fuscescens*), shrub
- water sedge (*Carex aquatilis*), grass
- red cottongrass (*Eriophorum russeolum*), grass
- creeping sedge (*Carex chordorrhiza*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous
- sphagnum (*Sphagnum*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

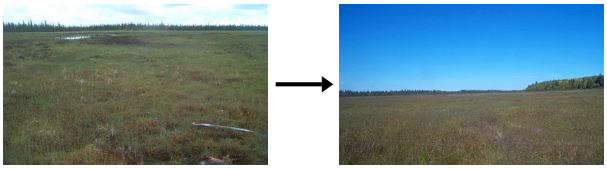


Dwarf birch-bog rosemary/cottongrasses-sedges

Water sedge-red cottongrass/purple marshlocks

Communities 1.1 and 1.2 co-occur on the terrace tread. If ponding increases in an area due to increased precipitation or inflow, the vegetation may shift. Increased hydrologic stressors will favor obligate wetland species.

Pathway 1.2A
Community 1.2 to 1.1



Water sedge-red cottongrass/purple marshlocks

Dwarf birch-bog rosemary/cottongrasses-sedges

Communities 1.1 and 1.2 co-occur on the terrace tread. Improved drainage on an area, soil development, or decreased inflow may cause a drop in the associated water table. Vegetation may shift towards community 1.1 as obligate species lose habitat and more facultative shrubs increase in cover.

Additional community tables

Inventory data references

Modal points for Community 1.1
08SS20206
08SS10805
09AO11303
10SS114052
10TD10705

Modal points for community 1.2
07MM05106
08SS20205
08SS12601
08SS07606

References

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Approval

Kirt Walstad, 2/13/2024

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	04/28/2024
Approved by	Kirt Walstad

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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
