

Ecological site R150BY728TX Subaqueous Grassflat

Last updated: 9/22/2023
Accessed: 05/04/2024

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.

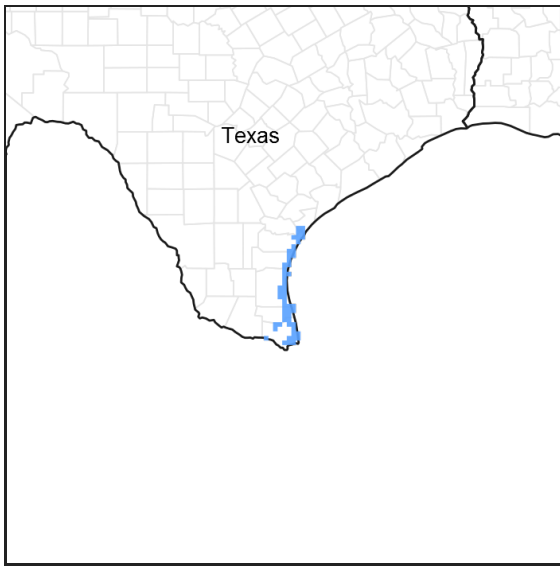


Figure 1. Mapped extent

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): 150B–Gulf Coast Saline Prairies

MLRA 150B is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain and entirely in Texas. It makes up about 3,420 square miles. It is characterized by nearly level to gently sloping coastal lowland plains dissected by rivers and streams that flow toward the Gulf of Mexico. Barrier islands and coastal beaches are included. The lowest parts of the area are covered by high tides, and the rest are periodically covered by storm tides. Parts of the area have been worked by wind, and the sandy areas have gently undulating to irregular topography because of low mounds or dunes. Broad, shallow flood plains are along streams flowing into the bays. Elevation generally ranges from sea level to about 10 feet, but it is as much as 25 feet on some of the dunes. Local relief is mainly less than 3 feet. The towns of Groves, Texas City, Galveston, Lake Jackson, and Freeport are in the northern half of this area. The towns of South Padre Island, Loyola Beach, Corpus Christi, and Port Lavaca are in the southern half. Interstate 37 terminates in Corpus Christi, and Interstate 45 terminates in Galveston.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.

-Major Land Resource Area (MLRA) 150B

Ecological site concept

The Subaqueous Grassflats generally are covered by less than 4 feet of water, and the shallowest parts commonly are exposed at the lowest tides. The water depth, as well as the salinity and turbidity, determines the types of grasses that grow on the muddy sand and shell bottom.

Associated sites

R150BY552TX	Tidal Flat Higher elevation and not submerged permanently.
R150BY716TX	Wind Tidal Flat Higher elevation and not submerged permanently.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Halodule wrightii</i> (2) <i>Cymodocea filiformis</i>

Physiographic features

These nearly level soils are in shallow-water grass flats of bays and lagoons. Water depth is generally less than 4 feet. Slope ranges from 0 to 1 percent but is mostly is less than 0.5 percent. Elevation ranges from -5 to 0 feet.

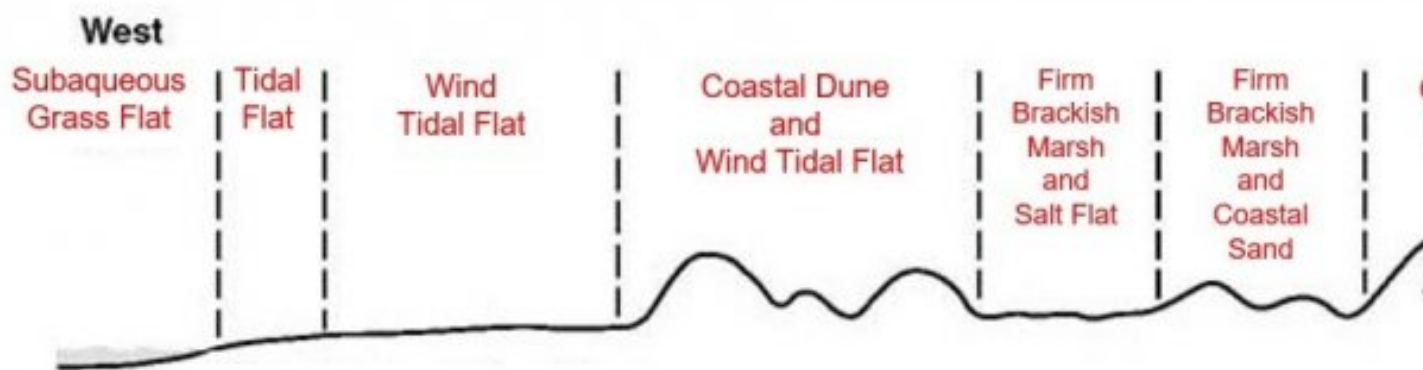


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) Lagoon > Lagoon bottom
Runoff class	Negligible
Flooding duration	Very long (more than 30 days)
Flooding frequency	None to very frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	0 m
Slope	0–1%
Ponding depth	0–122 cm

Climatic features

The climate is predominately maritime, controlled by the warm and very moist air masses from the Gulf of Mexico. The climate along the upper coast of the barrier islands is subtropical subhumid and the climate on the lower coast of Padre Island is subtropical semiarid (due to high evaporation rates that exceed precipitation). Almost constant sea breezes moderate the summer heat along the coast. Winters are generally warm and are occasionally interrupted by incursions of cool air from the north. Spring is mild and damaging wind and rain may occur during spring and summer months. Tropical cyclones or hurricanes can occur with wind speeds of greater than 74 mph and have the potential to cause flooding from torrential rainstorms. Despite the threat of tropical storms, the storms are rare. Throughout the year, the prevailing winds are from the southeast to south-southeast.

The average annual precipitation is 45 to 57 inches in the northeastern half of this area, 26 inches at the extreme southern tip of the area, and 30 to 45 inches in the rest of the area. Precipitation is abundant in spring and fall in the southwestern part of the area and is evenly distributed throughout the year in the northeastern part. Rainfall typically occurs as moderate-intensity, tropical storms that produce large amounts of rain during the winter. The average annual temperature is 68 to 74 degrees F. The freeze-free period averages 340 days and ranges from 315 to 365 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	660-813 mm
Frost-free period (actual range)	365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	660-864 mm
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	737 mm

Climate stations used

- (1) CORPUS CHRISTI NAS [USW00012926], Corpus Christi, TX
- (2) PADRE IS NS [USC00416739], Padre Island Ntl Seashor, TX
- (3) PORT MANSFIELD [USC00417184], Port Mansfield, TX
- (4) PORT ISABEL CAMERON AP [USW00012957], Los Fresnos, TX
- (5) PORT ISABEL [USC00417179], Port Isabel, TX

Influencing water features

These soils are permanently submersed in seawater

Wetland description

This site is permanently submersed with seawater.

Soil features

The Baffin series consists of very deep, very poorly drained (permanently submersed) soils that formed in slightly fluid sandy and loamy estuarine sediments. The Baffin series is the only correlate soil and is classified as a Coarse-loamy, siliceous, active, calcareous, hyperthermic Sodic Hydraquents.

Table 4. Representative soil features

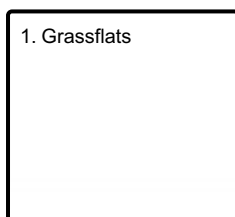
Parent material	(1) Lagoonal deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Sandy clay loam (2) Fine sandy loam
Drainage class	Subaqueous
Permeability class	Slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Calcium carbonate equivalent (0-152.4cm)	0–15%
Clay content (0-5.1cm)	20–30%
Electrical conductivity (0-152.4cm)	35–85 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	35–75
Soil reaction (1:1 water) (0-152.4cm)	6.5–8.4

Ecological dynamics

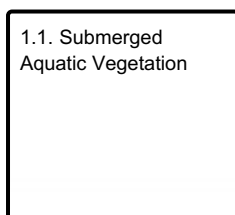
In shallow, quiet areas of the lagoon, away from the high-energy shorelines, are broad, subaqueous flats upon which thrive marine grasses and a variety of invertebrates. Grassflats are dominated by shoalgrass, but it also includes clovergrass, turtlegrass, manateegrass, and widgeongrass. The grassflats of the Upper Laguna Madre were at water depths generally less than 4 feet. The southern portion of the Upper Laguna Madre is an area known locally as The Hole. The “Hole” is a shallow sub-bay system with depths of 2.5 feet or less, and often less than 1 foot. Seagrass beds have consistently been recognized as important coastal nursery habitat for a variety of fisheries and wildlife. This relative abundance of submerged aquatic vegetation is the result of shallow and clear water, allowing good light penetration. Laguna Madre waters are clear because these lagoon bottoms are sandy and generally lack clayey sediments. Dredging and its potential effect on water clarity is a concern.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Grassflats

Dominant plant species

- shoalweed (*Halodule wrightii*), other herbaceous
- fern flatsedge (*Cyperus filicinus*), other herbaceous

Community 1.1 Submerged Aquatic Vegetation



In Upper Laguna Madre, grassflats are primarily composed of subtropical shoalgrass (*Halodule wrightii*) because this seagrass prefers shallower water and can tolerate higher salinity and turbidity. Other submerged aquatic vegetation on grassflats in this area include widgeon grass (*Ruppia maritima*), which tolerates lower salinity (even fresh) waters, and clovergrass (*Halophila engelmannii*). The tropical species manatee grass (*Cymodocea manatorium*) and turtlegrass (*Thalassia testudinum*) grow in relatively deeper waters, generally in Lower Laguna Madre or Corpus Christi Bay (south of Aransas Bay). Along Mustang Island, grassflats include a relatively broad expanse of seagrasses extending from the margins of wind-tidal flats along the bay side of the barrier island to the deeper waters in Corpus Christi Bay. Seagrass beds on the Texas Gulf Coast can suffer degradation or loss due to a variety of natural and anthropogenic causes. Tropical storms can impact seagrass beds depending on several factors, including storm frequency, intensity, and the environment and composition of the grassflat community. Other natural potential causes of submerged aquatic vegetation degradation are turbidity, sedimentation (from riverine sediment loads or sediment reworking in a subtidal system), and bioturbation. Anthropogenic disturbances include coastal development, boating, dredging, responses to nutrient loading (e.g., algal blooms), and loss of riverine freshwater marsh.

Additional community tables

Animal community

The animal communities of the Coastal Prairie communities are influenced by fresh and salt water inundations. Cattle and many species of wildlife make extensive use of the site. White-tailed deer may be found scattered across the prairie and are found in heavier concentrations where woody cover exists. Feral hogs are present and at times become abundant. Coyotes are abundant and fill the mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Alligators are locally abundant and make frequent use of the marshes depending on salt concentrations in the marshes.

The region is a major flyway for waterfowl and migrating birds. Hundreds of thousands of ducks, geese, and sandhill cranes abound during winter. Whooping cranes are an important endangered species that occur in the area, especially near Aransas National Wildlife Refuge. Northern harriers are common predatory birds seen patrolling marshes. Curlews, plovers, sandpipers, and willets are shorebirds that make use of the tidal areas. Seagulls and terns are plentiful throughout the year trolling the shores as well. Further inland, rails, gallinules, and moorhens make use of the brackish marshes.

Inventory data references

Information presented was derived from the Range Site Description, NRCS clipping data, literature, field observations, and personal contacts with range-trained personnel.

Other references

- Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. *Ecological implications of livestock herbivory in the West*, 13-68.
- Archer, S. and F. E. Smeins. 1991. Ecosystem-level processes. *Grazing Management: An Ecological Perspective*. Edited by R.K. Heischmidt and J.W. Stuth. Timber Press, Portland, OR.
- Bailey, V. 1905. North American Fauna No. 25: Biological Survey of Texas. United States Department of Agriculture Biological Survey. Government Printing Office, Washington D. C.
- Beasom, S. L, G. Proudfoot, and J. Mays. 1994. Characteristics of a live oak-dominated area on the eastern South Texas Sand Plain. In the Caesar Kleberg Wildlife Research Institute Annual Report, 1-2.
- Bestelmeyer, B. T., J. R. Brown, K. M. Havstad, R. Alexander, G. Chavez, and J. E. Herrick. 2003. Development and use of state-and-transition models for rangelands. *Journal of Range Management*, 56(2):114-126.
- Briske, B. B, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver. 2008. Recommendations for development of resilience-based State-and-Transition Models. *Rangeland Ecology and Management*, 61:359-367.
- Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. *Ecology*, 80(7):2385-2396.
- Butzler, R. E. 2006. The Spatial and Temporal Patterns of *Lycium carolinianum* Walt. M. S. Thesis. Texas A&M, College Station, TX.
- Chabreck, R. H. 1972. Vegetation, water and soil characteristics of the Louisiana coastal region. Louisiana State University Agriculture Experiment Station Bulletin, 664.
- Davis, W. B. 1974. The Mammals of Texas. Texas Parks and Wildlife Department Bulletin, 41.
- Drawe, D. L., A. D. Chamrad, and T. W. Box. 1978. Plant communities of the Welder Wildlife Refuge. The Welder Wildlife Refuge, Sinton, TX.
- Drawe, D. L., K. R. Kattner, W. H. McFarland, and D. D. Neher. 1981. Vegetation and soil properties of five habitat types on north Padre Island. *Texas Journal of Science*, 33:145-157.
- Everitt, J. H., D. L. Drawe, and R. I. Leonard. 2002. Trees, Shrubs, and Cacti of South Texas. Texas Tech University Press, Lubbock, TX.
- Foster, J. H. 1917. Pre-settlement fire frequency regions of the United States: A first approximation. *Tall Timbers Fire Ecology Conference Proceedings*, 20.
- Frost, C. C. 1995. Presettlement fire regimes in southeastern marshes, peatlands, and swamps. *Tall Timbers Fire Ecology Conference Proceedings*, 19:39-60.
- Fulbright, T. E., D. D. Diamond, J. Rappole, and J. Norwine. 1990. The Coastal Sand Plain of Southern Texas. *Rangelands*, 12:337-340.
- Fulbright, T. E., J. A. Ortega-Santos, A. Lozano-Cavazos, and L. E. Ramirez-Yanez. 2006. Establishing vegetation on migrating inland sand dunes in Texas. *Rangeland Ecology and Management*, 59:549-556.
- Gosselink, J.D., C.L. Cordes, and J.W. Parsons. 1979. An. Ecological characterization study of the Chenier Plain Coastal Ecosystem of Louisiana and Texas. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.
- Gould, F. W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX.

- Gould, F. W. and T. W. Box. 1965. Grasses of the Texas Coastal Bend. Texas A&M University Press, College Station, TX.
- Grace, J. B., L. K. Allain, H. Q. Baldwin, A. G. Billock, W. R. Eddleman, A. M. Given, C. W. Jeske, and R. Moss. 2005. Effects of prescribed fire in the coastal prairies of Texas. USGS Open File Report, 2005-1287.
- Hamilton, W. and D. Ueckert. 2005. Rangeland woody plant control: Past, present, and future. Brush management: Past, present, and future, 3-16.
- Harcombe, P. A. and J. E. Neville. 1997. Vegetation types of Chambers County, Texas. The Texas Journal of Science, 29:209-234.
- Hatch, S. L., J. L. Schuster, and D. L. Drawe. 1999. Grasses of the Texas Gulf Prairies and Marshes. Texas A&M University Press, College Station, TX.
- Johnson, M. C. 1963. Past and present grasslands of southern Texas and northeastern Mexico. Ecology 44(3):456-466.
- Lehman, V. W. 1965. Fire in the range of Attwater's prairie chicken. Tall Timbers Fire Ecology Conference Proceedings, 4:127-143.
- Mann, C. 2004. 1491: New Revelations of the Americas before Columbus. Vintage Books, New York City, NY.
- Mapston, M. E. 2007. Feral Hogs in Texas. Texas Agrilife Extension Bulletin, B-6149
- McAtee, J. W., C. J. Scifres, D. L. and Drawe. 1979. Digestible energy and protein content of gulf cordgrass following burning or shredding. Journal of Range Management, 376-378.
- McGowen, J. H., L. F. Brown, T. J. Evans, W. L. Fisher, and C. G. Groat. 1976. Environmental geologic atlas of the Texas Coastal Zone-Bay City-Freeport area. The University of Texas at Austin, Bureau of Economic Geology, Austin, TX.
- Miller, D. L., F. E. Smeins, and J. W. Webb. 1998. Response of a Texas *Distichlis spicata* coastal marsh following Lesser Snow Goose herbivory. Aquatic Botany, 61:301-307.
- Miller, D. L., F. E. Smeins, and J. W. Webb. 1996. Mid-Texas coastal marsh change (1939-1991) as influenced by Lesser Snow Goose herbivory. Journal of Coastal Research, 12:462-476.
- Miller, D. L., F. E. Smeins, J. W. Webb, and M. T. Longnecker. 1997. Regeneration of *Scirpus americanus* in a Texas coastal marsh following Lesser Snow Goose herbivory. Wetlands, 17:31-42.
- Oefinger, R. D. and C. J. Scifres. 1977. Gulf cordgrass production, utilization, and nutritional value following burning. Texas Agricultural Experiment Station Bulletin, B-1176.
- Palmer, G. R., T. E. Fulbright, and G. McBryde. 1995. Inland sand dune reclamation on the Coastal Sand Plain of Southern Texas. Caesar Kleberg Wildlife Research Institute Annual Report, 1994-1995.
- Pulich, Jr., W. 1999. Seagrass Conservation Plan for Texas. Texas Parks and Wildlife Resource Division. Texas Parks and Wildlife Department, Austin, TX.
- Prichard, D. 1998. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lotic areas. Bureau of Land Management, Denver, CO.
- Rappole, J. H. and G. W. Blacklock. 1985. Birds of the Texas Coastal Bend: Abundance and distribution. Texas A&M University Press, College Station, TX.
- Scifres, C. J. and W. T. Hamilton. 1993. Prescribed burning for brushland management: The South Texas example. Texas A&M Press, College Station, TX.

- Scifres, C. J., J. W. McAtee, and D. L. Drawe 1980. Botanical, edaphic, and water relationships of gulf cordgrass (*Spartina spartinae* [Trin.] Hitchc.) and associated communities. *The Southwestern Naturalist*, 25(3):397-409.
- Shiflet, T. N. 1963. Major ecological factors controlling plant communities in Louisiana marshes. *Journal of Range Management*, 16:231-235.
- Singleton, J. R. 1951. Production and utilization of waterfowl food plants on the east Texas gulf coast. *Journal of Wildlife Management*, 15:46-56.
- Smeins, F. E., D. D. Diamond, and W. Hanselka. 1991. Coastal prairie, 269-290. *Ecosystems of the World: Natural Grasslands*. Edited by R. T. Coupland. Elsevier Press, Amsterdam, Netherlands.
- Smeins, F. E., S. Fuhlendorf, and C. Taylor, Jr. 1997. Environmental and land use changes: A long term perspective. *Juniper Symposium*, 1-21.
- Snyder, R. A. and C. L. Boss. 2002. Recovery and stability in barrier island plant communities. *Journal of Coastal Research*, 18:530-536.
- Stoddart, L. A., A. D. Smith, and T. W. Box. 1975. *Range management*. McGraw-Hill Book Co., New York, NY.
- Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2001. State and transition modeling: An ecological process approach. *Journal of Range Management*, 56(2):106-113.
- Thornthwaite, C. W. 1948. An approach towards a rational classification of climate. *Geographical Review*, 38: 55-94.
- Thurrow, T. L. 1991. Hydrology and erosion. *Grazing Management: An Ecological Perspective*. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.
- Urbatsch, L. 2000. Chinese tallow tree *Triadica sebifera* (L.) Small. USDA-NRCS, National Plant Center, Baton Rouge, LA.
- Van't Hul, J. T., R. S. Lutz, and N. E. Mathews. 1997. Impact of prescribed burning on vegetation and bird abundance on Matagorda Island, Texas. *Journal of Range Management*, 50:346-360.
- Vines, R. A. 1977. *Trees of Eastern Texas*. University of Texas Press, Austin, TX.
- Vines, R. A. 1984. *Trees of Central Texas*. University of Texas Press, Austin, TX.
- Wade, D. D., B. L. Brock, P. H. Brose, J. B. Grace, G. A. Hoch, and W. A. Patterson III. 2000. Fire in Eastern ecosystems. *Wildland fire in ecosystems: effects of fire on flora*. Edited by J. K. Brown and J. Kaplers. United States Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Warren, W. S. 1998. *The La Salle Expedition to Texas: The journal of Henry Joutel, 1684-1687*. Edited by W. C. Foster. Texas State Historical Association, Austin, TX.
- Weaver, J. E. and F. E. Clements. 1938. *Plant ecology*. McGraw-Hill, New York, NY.
- Williams, A. M., R. A. Feagin, W.K. Smith, and N. L. Jackson. 2009. Ecosystem impacts of Hurricane Ike on Galveston Island and Bolivar Peninsula: Perspectives of the coastal barrier island network (CBIN). *Shore and Beach*, 7(2):1-5.
- Williams, L. R. and G. N. Cameron. 1985. Effects of removal of pocket gophers on a Texas coastal prairie. *The American Midland Naturalist Journal*, 115:216-224.
- Wright, H.A. and A.W. Bailey. 1982. *Fire Ecology: United States and Southern Canada*. John Wiley & Sons, Inc., Hoboken, NJ.

Contributors

Tyson Hart, Ecologist, NRCS, Nacogdoches, TX

Approval

Bryan Christensen, 9/22/2023

Acknowledgments

Site Development and Testing Plan:

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high-intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

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	05/04/2024
Approved by	Bryan Christensen
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:**
