Ecological site TX150B01X732
Turbid Bay Bottom

Last updated: 6/13/2025
Accessed: 03/22/2026

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): 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. 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 Turbid Bay Bottoms are continuously inundated by saline water on barrier coves and mainland coves on lagoon bottoms. They were formed from fine and loamy estuarine and lagoonal deposits. Finer-textured soils and energy from tidal movement and wave action

cause more sediment suspension in the water column. The resulting salinity and turbidity ultimately determine the type and amount of grasses capable of growing on the estuarine coves and lagoonal bay bottoms.

Associated sites

TX150B01X730	**Sandy Bay Bottom** This site has lower turbidity and greater vegetation coverage.

Similar sites

TX150B01X730	**Sandy Bay Bottom** This site has lower turbidity and greater vegetation coverage.
R150BY728TX	**Subaqueous Grassflat** This site has greater vegetation coverage and more southern geographic location.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Halodule wrightii*

Legacy ID

R150BY732TX

Physiographic features

The sites are found on barrier coves, estuarine tidal streams, mainland coves, and bottoms of lagoons on the coastal plain. This nearly level site's elevation that from -6 to 0 feet. These soils are permanently inundated and range in water depth from 0 to 6.6 feet (0 to 2.0 meters).

Table 2. Representative physiographic features

Landforms	(1) Lagoon > Barrier cove (2) Lagoon > Lagoon bottom (3) Lagoon > Mainland cove
Flooding duration	Very long (more than 30 days)
Flooding frequency	Very frequent
Slope	0–1%
Water table depth	0–203 cm

Aspect	Aspect is not a significant factor

Climatic features

The climate is predominately maritime, controlled by the warm and very moist air masses from the gulf. 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 miles per hour 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 representative precipitation is 36 to 46 inches in this area. Rainfall typically peaks during the spring, summer, and fall months, yet is generally uniform through out the year. The average annual air temperature is 69 to 71 degrees Fahrenheit.

Table 3. Representative climatic features

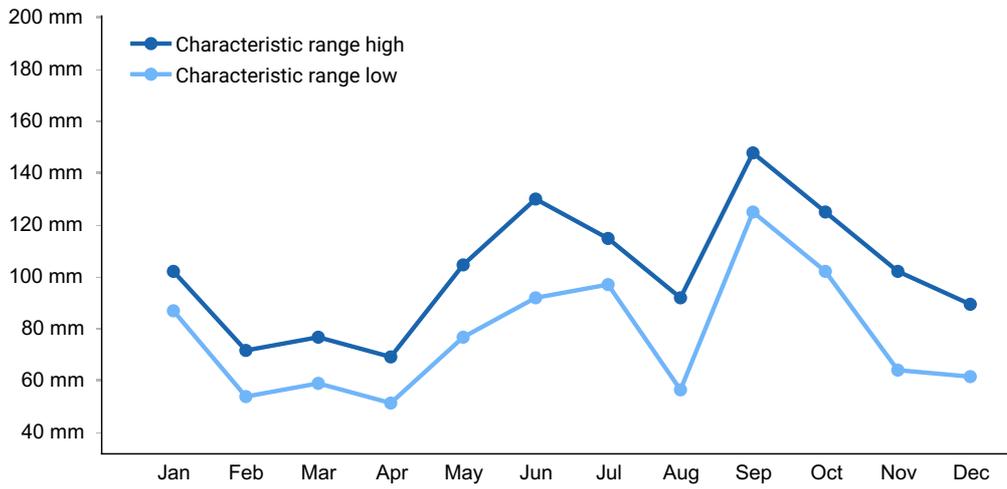|	
Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	914-1,168 mm
Frost-free period (actual range)	
Freeze-free period (actual range)	
Precipitation total (actual range)	889-1,270 mm
Frost-free period (average)	
Freeze-free period (average)	
Precipitation total (average)	1,067 mm

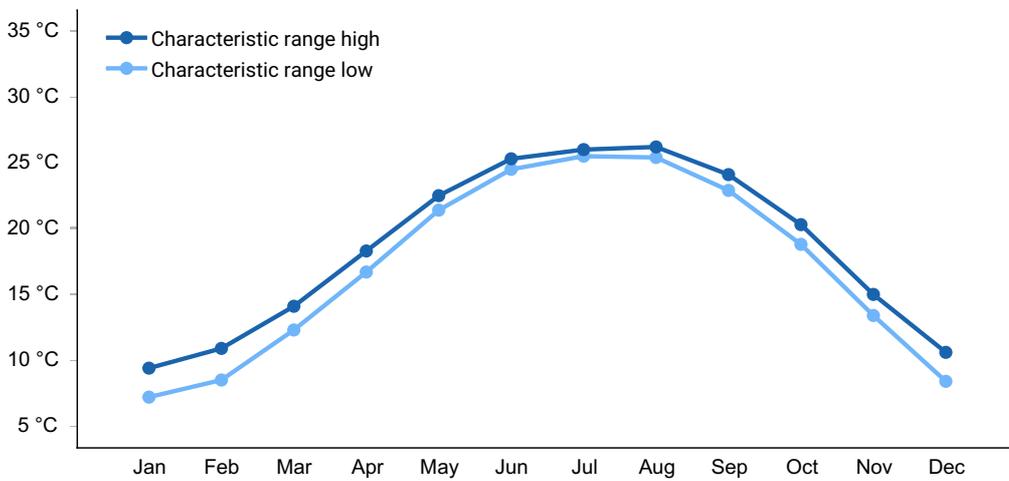**Figure 1. Monthly precipitation range**

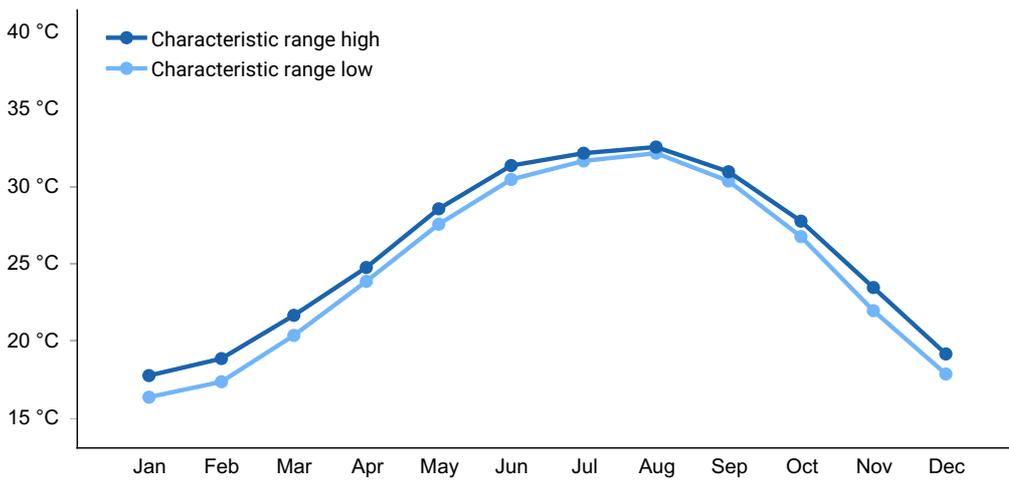**Figure 2. Monthly minimum temperature range**

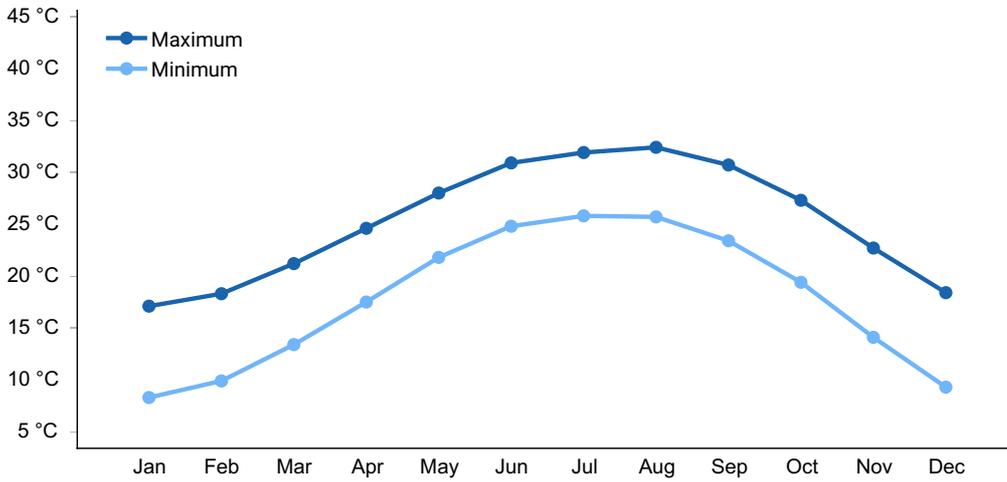**Figure 3. Monthly maximum temperature range**

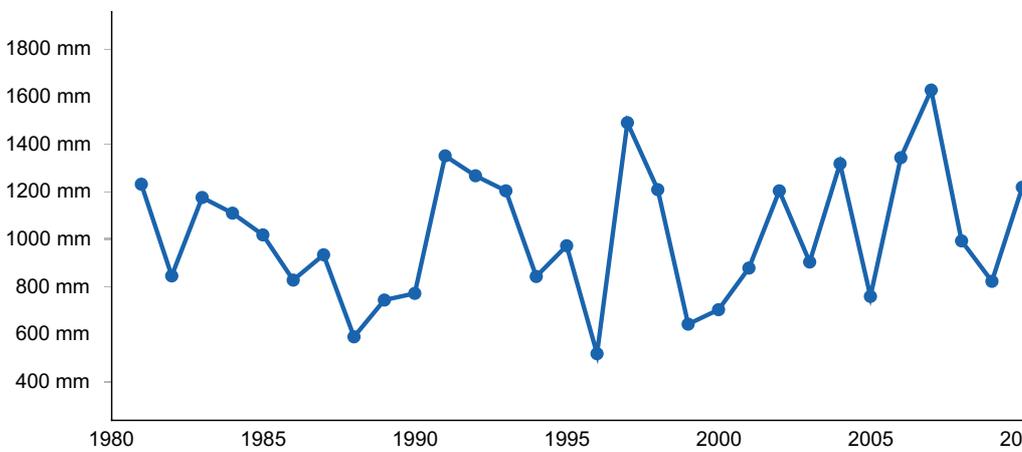**Figure 4. Monthly average minimum and maximum temperature**

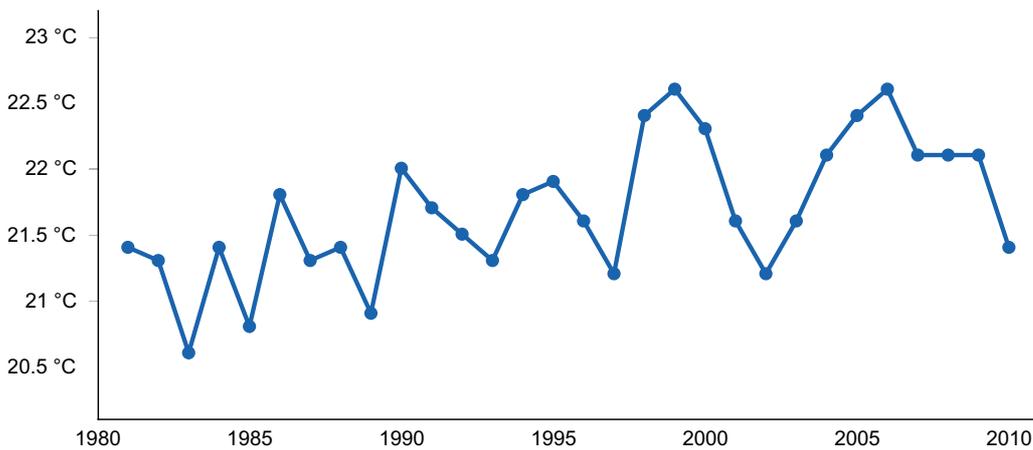

Figure 5. Annual precipitation pattern

Figure 6. Annual average temperature pattern

Climate stations used

- (1) CORPUS CHRISTI NAS [USW00012926], Corpus Christi, TX
- (2) GALVESTON [USW00012944], Galveston, TX
- (3) GALVESTON SCHOLES FLD [USW00012923], Galveston, TX
- (4) PORT O'CONNOR [USC00417186], Port O Connor, TX

Influencing water features

These soils are permanently submersed and are located in bayside (mainland-side) subtidal areas. Sites are mesohaline and polyhaline with typical water salinity ranges of 11 to 35 parts per thousand. Ambient water temperature follows the same pattern as air temperature, averaging 0.8 to 3.0 degrees Fahrenheit warmer. From 2018 to 2023, the monthly average annual water temperature from four nearby buoys was: 56.5, 58.5, 67.0, 72.0, 80.5, 85.8, 87.5, 88.0, 84.4, 76.0, 64.8, and 60.7 degrees Fahrenheit. Stations used include: LUIT2, EPTT2, GRRT2, and GTOT2 from NOAA's National Data Buoy Center.

Wetland description

Classification System: Cowardin
System: Estuarine
Subsystem: Subtidal
Class: Aquatic Beds

Soil features

This ecological site consists of very deep, subaqueous soils that formed in loamy lagoonal sediments and/or estuarine deposits. Surface textures within this site include very fine sandy loam, sandy loam, loam and clay loam. Soils are hyperthermic and classified as Sulfiwassents or Haplowassents depending on the presence of acid-producing, oxidizable sulfur compounds with a depth of 20 inches (50 centimeters). Soil series correlated to this site includes: Amarada, Danacove, Jonesbay, and Maggies.

Table 4. Representative soil features

| Parent material	(1) Estuarine deposits (2) Lagoonal deposits
Surface texture	(1) Very fine sandy loam (2) Sandy loam (3) Loam (4) Clay loam
Drainage class	Subaqueous
Soil depth	203 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0%
Calcium carbonate equivalent (0-203.2cm)	0–5%

Clay content (0-203.2cm)	15–45%
Electrical conductivity (0-203.2cm)	10–30 mmhos/cm
Sodium adsorption ratio (0-203.2cm)	12–60
Soil reaction (1:1 water) (0-203.2cm)	6.1–8.4

Ecological dynamics

Interwoven through tidal flats, lagoons, estuaries, and bay bottoms adjacent to the mainland reside the Turbid Bay Bottom ecological sites. Protected from the harsh oceanside shorelines, these hyperthermic subaqueous bottoms contain predominately shoalweed. Soils are continuously inundated, displaying iron and sulfate chemical reductions, indicating soils have decreased oxygen availability. Despite their fragile nature, subaqueous soils are nursery grounds for a variety of plants and animals. Subaqueous soils protect shorelines from storm impacts, sequester carbon, and filter water of pollutants. Turbid Bay Bottom sites may be affected by anthropogenic factors including dredging and coastal development, as well as natural forces such as hurricanes.

State and transition model
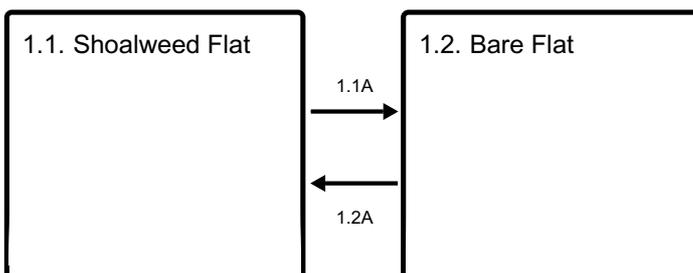
Ecosystem states
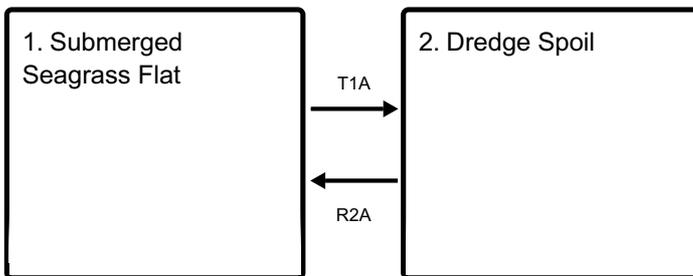
T1A - Increased turbidity, lowered salinity, vegetation burial, and alterations to bay bottom substrate.

R2A - Restoration of seagrass flats by improvements in soil and water quality to reestablish plant growth.

State 1 submodel, plant communities
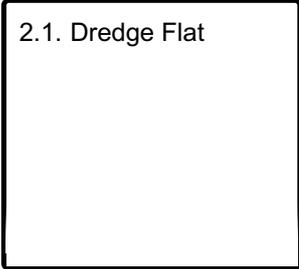

1.1A - Tropical storm or other natural disturbance negatively changing conditions for submerged aquatic

vegetation.

1.2A - As time allows sediments to settle and water conditions to improve, plants will recolonize the ecological site.

State 2 submodel, plant communities

```
┌─────────────────────┐
│ 2.1. Dredge Flat    │
│                     │
│                     │
│                     │
│                     │
│                     │
└─────────────────────┘
```

State 1
Submerged Seagrass Flat

Submerged aquatic vegetation is a term for plants that grow completely underwater, except for brief exposures during low tides. Healthy vegetative communities are important to estuarine systems for erosion control and create vital habitat for a diversity of aquatic organisms.

Community 1.1
Shoalweed Flat

The Turbid Bay Bottom ecological site is primarily composed of shoalweed (*Halodule wrightii*). Shoalweed is considered a pioneer species and will colonize disturbed sites because of its ability to handle a wide range of temperatures and salinities. Shoalweed can extablish quickly and form large colonies. The high turbidity levels reduce light and create more difficult environments for seagrass to colonize densely.

Community 1.2
Bare Flat

Seagrass beds on the Texas Gulf Coast can suffer degradation due to a variety of natural causes. Tropical storm impacts on seagrass beds are influenced by multiple factors, including storm recurrence, washover deposition, and the unique composition and environment of the plant community. The intensity of a hurricane plays a large role on the overall impact.

Pathway 1.1A

Community 1.1 to 1.2

Tropical storm or other natural disturbance negatively changing conditions for submerged aquatic vegetation.

Pathway 1.2A
Community 1.2 to 1.1

As time allows sediments to settle and water conditions to improve, plants will recolonize the ecological site.

State 2
Dredge Spoil

Dredge spoils are materials taken from the bed or banks of waters by using dredging equipment. Areas in the Gulf Intracoastal Waterway are periodically dredged to aid in marine navigation and transport.

Community 2.1
Dredge Flat

This plant community is in a dredge impacted state. Alterations to water and soil characteristics following dredging drive a change in plant community away from a submerged aquatic dominated plant community to a site with little to no vegetation coverage. The mass movement of subaqueous soils from dredging may decrease pH levels and increase turbidity causing cascading impacts across trophic levels. As light attenuation raises from increased suspended sediment, subaqueous vegetation no longer receives the required energy to survive and vegetation presence becomes sparse to none.

Transition T1A
State 1 to 2

The driver of this change is alterations to the bay bottom substrate. This occurs by the human-influenced activities of piling spoil after dredging channels.

Restoration pathway R2A
State 2 to 1

Significant improvements in soil and water quality are necessary to reestablish plant growth. Restoration of seagrass flats in areas affected by dredge spoils may necessitate human intervention.

Additional community tables

Inventory data references

The provisional concepts listed are based on observations from soil survey staff during the associated subaqueous soil mapping project, as well as, literature review and professional consensus. As more data is collected, the concepts will continue to be tested and refined.

Other references

Austin, A.N., J.P., Hansen, S. Donadi, and J.S. Eklof. 2016. Relationships between aquatic vegetation and water turbidity: A field survey across seasons and spatial scales. PLoS ONE 12:1-20

Cowardin, L.M. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, U.S. Department of the Interior.

Erich, E., P.J. Drohan, L.R. Ellis, M.E. Collins, M. Payne, and D. Surabian. 2010. Subaqueous soils: Their genesis and importance in ecosystem management. Soil Use and Management 26:245-252.

Johnson, J.S., D.M. Cairns, and C. Houser. 2013. Coastal marsh vegetation assemblages of Galveston Bay: Insights for the east Texas Chenier Plain. Wetlands 33:861-870.

Lester, J., and L. Gonzalez. 2022. The state of the Bay: A characterization of the Galveston Bay ecosystem. Galveston Bay Estuary Program. http://gbep.tamug.edu

Pulich, W.M., and W.A. White. 1991. Decline of submerged vegetation in the Galveston Bay System: Chronology and Relationships to Physical Processes. Journal of Coastal Research 7:1125-1138.

Scheffer, M. 1999. The effect of aquatic vegetation on turbidity; how important are the filter feeders? Hydrobiologia 408/409:307-316.
Sheridan, P., G. McMahn, K. Hammerstrom, and W. Pulich Jr. 1998. Factors affecting restoration of *Halodule wrightii* to Galveston Bay, Texas. Restoration Ecology 6:144-158.

Stolt, M., J. Turenne, and M. Payne. Soil Survey Manual - Ch. 10. Subaqueous Soil Survey. United States Department of Agriculture, Natural Resources Conservation Service. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcseprd1343022

U.S. Department of Agriculture, Natural Resources Conservation Service. 2016. National soil survey handbook, title 430-VI. Part 629—Glossary of landform and geologic terms.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2022. Plant Fact Sheets. Retrieved from PLANTS Database: https://plants.usda.gov/java/

Contributors

Monica Polgar

Tyson Hart

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	03/22/2026
Approved by	Jamin Johanson
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:**