

Ecological site R023XY220OR

CLAYEY

10-12 PZ

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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.

Associated sites

R023XY200OR	<p>PONDED CLAY</p> <p>Ponded Clay</p>
R023XY212OR	<p>LOAMY 10-12 PZ</p> <p>Loamy 10-12" PZ</p>
R023XY214OR	<p>CLAYPAN 10-12 PZ</p> <p>Claypan 10-12" PZ</p>

Similar sites

R023XY212OR	<p>LOAMY 10-12 PZ</p> <p>Loamy 10-12" PZ (lacks a clayey argillic horizon)</p>
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i>

Physiographic features

This site occurs on terraces, rolling uplands, and mountain foothills. Slopes range from 0 to 30 percent, but gradients of 2 to 20 percent are most typical. Elevations range from 4500 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,370 – 1,830 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 10 to 12 inches, most of which occurs in the form of snow during the months of December through February. Spring rains are common. The soil temperature regime is frigid. Extreme temperatures range from 100 degrees F to -30 degrees F. The frost-free period is from 50 to 90 days. The optimum period for plant growth is mid-April through June.

Table 3 Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	0 days
Precipitation total (average)	310 mm

Influencing water features

Soil features

The soils of this site are shallow to deep over bedrock but a fine textured layer (clay) is present below a depth of about 8 or 10 inches. Surface textures are typically loam or clay loam with subsoil textures of clay and/or silty clay. The soils are well-drained and permeability is slow to very slow. When this site is on old terraces, rock fragments on the surface are absent. When this site is on uplands or foothills (which is most typical) the percent of rock fragments (primarily cobbles and stones) range from 15 to 60 percent. The available water holding capacity (AWC) is 1 to 5 inches for the profile. Water erosion hazard is moderate.

Table 4. Representative soil features

Parent material	(1) Colluvium – basalt (2) Residuum – welded tuff
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Surface texture	(1) Cobbly loam (2) Very cobbly clay loam (3) Silt loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to very slow
Soil depth	30 – 100 cm
Surface fragment cover <=3"	10 – 20 %
Surface fragment cover >3"	0 – 30 %
Available water capacity (0-101.6cm)	2.03 – 12.19 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	20 – 30 %

Subsurface fragment volume >3" (Depth not specified)	10 – 20 %
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Ecological dynamics

Range in Characteristics:

Variability in production and composition on a site result from variation in soil depth and texture. Restrictive layers (claypan) within 20 inches of the soil surface will reduce production. Gravels in the surface layer or a decrease in clay in the subsoil will favor the presence of Thurber needlegrass in the stand. If significant soil loss occurs on this site, it will grade into the Claypan 10-12" PZ site.

Four states have been identified for this site: a reference state; a state with the presence of annuals; a state with a shrub/annual co-dominance; and a state with annual dominance.

Reference State: Plant community phase change is driven by infrequent fire. Wyoming and basin big sagebrush decline after fire while Thurber's needlegrass, Indian ricegrass and other grasses increase. Rabbitbrush may temporarily increase after fire. Time facilitates the reintroduction of sagebrush. The introduction of invasive annual grasses and forbs transitions into state 2.

State 2: Compositionally similar to the reference state with a trace of cheatgrass and weedy forbs. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. Prescribed grazing and infrequent fire (> 50 year return interval) maintain state dynamics. The timing and/or intensity of grazing or prolonged drought favors Wyoming and basin big sagebrush, squirreltail and Sandberg's bluegrass. Prescribed grazing and/or release from drought may reverse the decline in needlegrass and Indian ricegrass production. Infrequent fire reduces the shrub community and promotes the bunchgrass component. Mismanaged grazing and/or prolonged drought leads to a biotic threshold and into state 3.

State 3: Wyoming and basin big sagebrush is decadent with little recruitment. The perennial grass component is significantly reduced in both density and productivity. Cheatgrass and/or annual forbs and/or Sandberg's bluegrass along with sagebrush control site resources and drive ecological dynamics. Bare ground is abundant. Spatial and temporal energy capture and nutrient cycling has been truncated. Infiltration may be reduced due to lack of ground cover. Risk of soil erosion by both wind and water is increased. Catastrophic wildfire will lead to an abiotic threshold and into state 4.

State 4: Cheatgrass and/or annual weed dominated plant community with limited to no shrub or perennial grass component. Soil erosion and redistribution along with changes in dynamic soil properties affect the hydrologic cycle and thus the nutrient cycle. Harsh environmental factors increase state resiliency to change.

Response to Disturbance:

If heavy grazing causes site deterioration, big sagebrush and rabbitbrush become dominant. Sandberg bluegrass, bottlebrush squirreltail, and forbs will increase in the understory. This site (with frigid soils) is less susceptible to cheatgrass invasion, but it can occur. Annual forbs will invade this site. As conditions deteriorate, the amount of bare ground will also increase.

State and transition model

Figure 3. Group 6, STM

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Perennial, deep-rooted, bunch-grass			504-706	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	504-706	–
2	Perennial, deep-rooted, bunch-grass			71-202	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	50-151	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	20-50	–
4	Perennial, shallow-rooted, bunch-grass			71-182	
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	50-101	–

	Cusick's bluegrass	POCU3	<i>Poa cusickii</i>	20-81	-
5	Other Perennial Grasses			20-101	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-20	-
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-20	-
	foxtail wheatgrass	PSSA2	<i>xPseudelymus saxicola</i>	0-20	-
Forb					
7	Perennial Forbs			40-81	
	milkvetch	ASTRA	<i>Astragalus</i>	10-20	-
	balsamroot	BALSA	<i>Balsamorhiza</i>	10-20	-
	hawksbeard	CREPI	<i>Crepis</i>	10-20	-
	lupine	LUPIN	<i>Lupinus</i>	10-20	-
9	Other perennial forbs			10-50	
	agoseris	AGOSE	<i>Agoseris</i>	0-10	-
	mariposa lily	CALOC	<i>Calochortus</i>	0-10	-
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0-10	-
	Douglas' dustymaiden	CHDOD	<i>Chaenactis douglasii var. douglasii</i>	0-10	-
	fleabane	ERIGE2	<i>Erigeron</i>	0-10	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-10	-
	Lava aster	IOAL	<i>Ionactis alpina</i>	0-10	-
	beardtongue	PENST	<i>Penstemon</i>	0-10	-
	phlox	PHLOX	<i>Phlox</i>	0-10	-
	ragwort	SENEC	<i>Senecio</i>	0-10	-
Shrub/Vine					
11	Evergreen			71-151	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	50-101	-
	basin big sagebrush	ARTRT	<i>Artemisia tridentata ssp. tridentata</i>	20-50	-
15	Other shrubs			20-50	
	rabbitbrush	CHRYS9	<i>Chrysothamnus</i>	0-20	-
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	0-20	-
	horsebrush	TETRA3	<i>Tetradymia</i>	0-20	-

Animal community

Livestock Grazing: This site is suited to livestock use in all seasons under a planned grazing system. Native Wildlife Associated with the Potential Climax Community: Mule deer Pronghorn antelope Sage grouse

Hydrological functions

The soils of this site have medium infiltration rates and moderate runoff potential. The hydrologic soil groups are C and D.

Wood products

This site is susceptible to invasion by western juniper. In this event, the site is capable of producing fence posts and firewood.

Contributors

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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)	Jeff Repp and Bruce Frannsen
Contact for lead author	State Rangeland Management Specialist for NRCS - OR
Date	08/16/2012
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None, Moderate sheet & rill erosion hazard

2. **Presence of water flow patterns:** None

3. **Number and height of erosional pedestals or terracettes:** None to very few pedestals

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**
15-40%

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None, Slight wind erosion hazard

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
Moderately resistant to erosion: aggregate stability = 3-5

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Shallow to deep well drained loams or clay loams, 15-60% surface fragments: Moderate OM (2-4%)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Low ground cover (15-25%) and gentle to moderate slopes (0-30%) slightly to moderately limit rainfall impact and overland flow

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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: Bluebunch wheatgrass > Thurber needlegrass > other grasses > shrubs > forbs

Sub-dominant:

Other:

Additional:

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

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):**
Favorable: 1000, Normal: 700, Unfavorable: 500 lbs/acre/year at high RSI (RPC)

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: Western Juniper readily invades the site. Cheatgrass and Medusahead invade sites that have lost deep rooted perennial grass functional groups.**

17. Perennial plant reproductive capability: All species should be capable of reproducing annually
