USDA Natural Resources
Conservation Service

Ecological site R023XY507OR
CLAYPAN 16-25 PZ

Accessed: 05/11/2025

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.

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.

Associated sites

R023XY510OR	**ROCKY RIDGES 16-35 PZ** Rocky Ridges 16-35" PZ

Similar sites

R023XY216OR	**CLAYPAN 12-16 PZ** CLaypan 12-16" PZ (lower precipitation and production)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula*
Herbaceous	(1) *Festuca idahoensis* (2) *Danthonia unispicata*

Physiographic features

This site occurs on ridgetops and shoulders in mountainous areas. Slopes range from 5 to 30%. Elevation ranges from 6500 to 7900 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	6,500–7,900 ft
Slope	5–30%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation is 16 to 25 inches most of which occurs as snow during December to March. Spring rains are common. The soil temperature regime is cryic. Mean air temperatures range from 40 to 43 degrees F. The frost-free period is 30 to 60 days. The period of optimum growth is from late May to late July.

Table 3. Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	0 days
Precipitation total (average)	25 in

Influencing water features

Soil features

The soils are very shallow to bedrock or to a strongly developed claypan. The soils are well drained and have developed in residuum. The permeability is moderatly slow to the bedrock or claypan. The available water holding capacity (AWC) is about 1 to 2 inches for the profile. The surface layer is typically a loam 5 to 12 inches thick with variable amounts of coarse fragments on the surface. The majority of the soils in this site have a strongly developed claypan subsoil with an abrupt boundary between it and the surface layer. The claypan contains about 20 to 27 percent clay. There is a moderate potentail for frost action and shrink-swell potential.

Table 4. Representative soil features

Parent material	(1) Residuum–basalt (2) Colluvium–andesite
Surface texture	(1) Very cobbly clay loam (2) Very stony
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	4–10 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	1.2–2.3 in
Calcium carbonate equivalent (0-40in)	0%

Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	14–16%
Subsurface fragment volume >3" (Depth not specified)	5–21%

Ecological dynamics

Range in Characteristics:
The reference native plant community is dominated by Idaho fescue and low sagebrush. Sheep fescue, one-spike oatgrass, and needlegrasses are also present in the stand. Vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs.

One-spike oatgrass increases on shallow soils with augmented late season moisture.

Four states have been identified for this site: a reference state; a state with the presence of annuals; a state that has juniper and low sagebrush co-dominant on the site, and a state with annual dominance.

Reference State: Stable plant community affected infrequently by fire. Sites are dominated with low sagebrush with some sites exhibiting a small percentage of old growth juniper. Infrequent fire (> 80 to 100 year intervals) maintains site dynamics. Fire reduces shrub cover in a mosaic, patchy pattern. 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/or medusahead and other annual weeds. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. Infrequent fire (> 80 to 100 years) reduces shrub cover, removes young juniper, and promotes grass production while time since fire allows shrub recovery. Mismanagement of grazing facilitates an increase in Sandberg bluegrass, weedy species, young juniper, and low sagebrush. Moderately-deep rooted bunchgrasses will decline in production and density. Prescribed grazing can reverse the trend. Loss of moderately-deep rooted perennial bunchgrasses and an increase in young juniper brings the site to State 3.

State 3: Low sagebrush and possibly young juniper dominated with minimal perennial, deep-rooted grasses. Cheatgrass and/or medusahead along with other weedy forbs are increased in density and cover. Sandberg bluegrass cover and vigor is declining. Water flow paths are evident. Sagebrush, and possibly juniper, control site resources. Catastrophic wildfire leading to annual dominated plant community will take the site to State 4.

State 4: Cheatgrass and/or medusahead dominated. Few old growth juniper may be present. Rabbitbrush increased with few to no low sagebrush. Wind and water erosion drive site processes.

Response to Disturbance:
As the site deteriorates low sagebrush, Sandberg bluegrass, and bottlebrush squirreltail increase in plant density while fescue and one-spike oatgrass decrease.

State and transition model

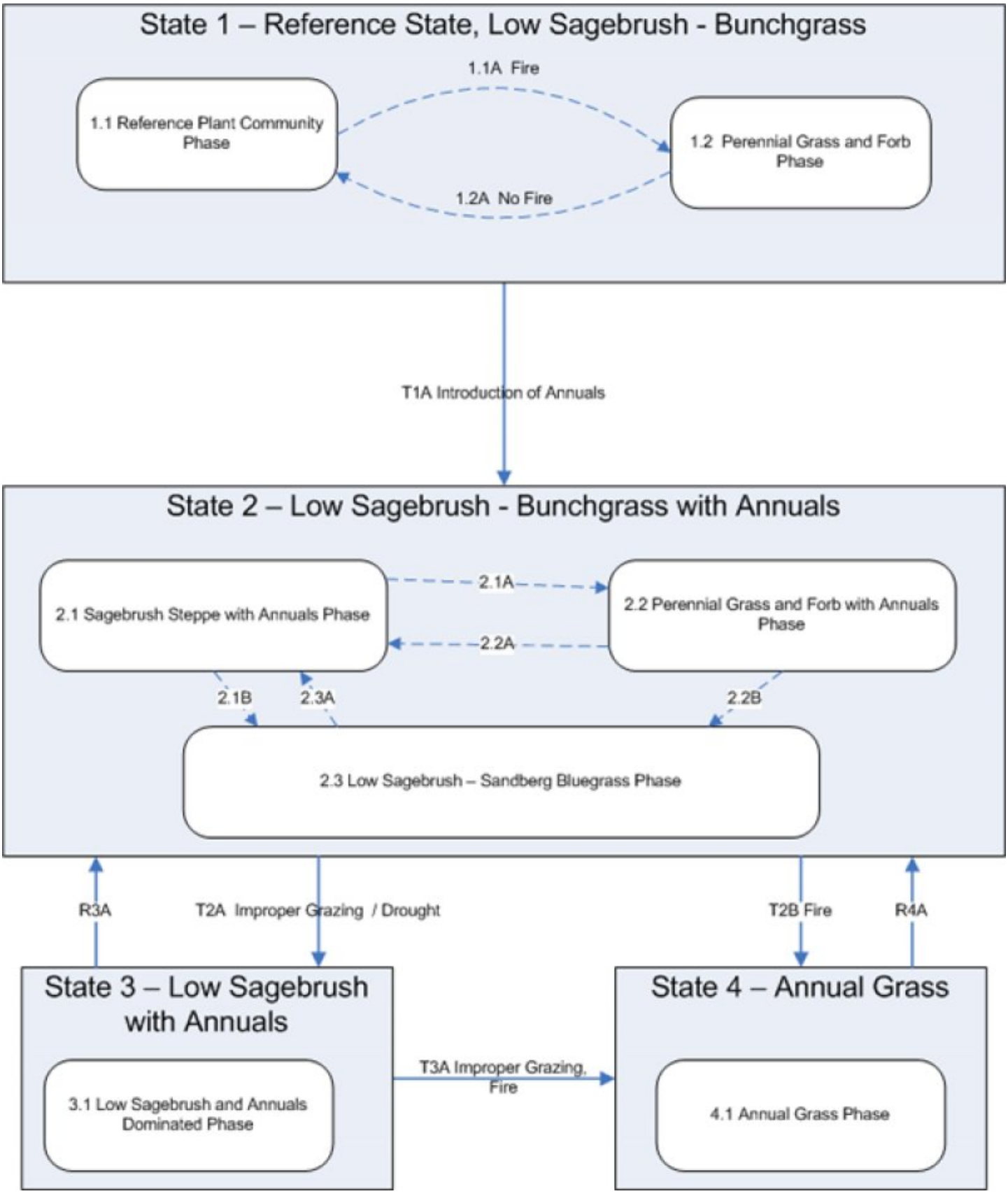

Figure 2. Group 10, STM

State 1
Reference State

Community 1.1
Reference Plant Community

The potential native community is dominated by Idaho fescue and low sagebrush. Sheep fescue, one-spike

oatgrass and needlegrasses are also present in the stand. Vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	325	455	585
Shrub/Vine	125	175	225
Forb	50	70	90
Total	**500**	**700**	**900**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial, moderately-deep rooted, bunchgrass**			280–350	
	Idaho fescue	FEID	*Festuca idahoensis*	280–350	–
2	**Perennial, moderately-deep rooted, bunchgrass**			70–175	
	onespike danthonia	DAUN	*Danthonia unispicata*	35–105	–
	sheep fescue	FEOV	*Festuca ovina*	35–70	–
4	**Perennial, moderately-deep rooted, bunchgrass**			56–140	
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	14–35	–
	western needlegrass	ACOCO	*Achnatherum occidentale ssp. occidentale*	14–35	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	14–35	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	14–35	–
5	**Other perennial grasses, all**			14–35	
	Sandberg bluegrass	POSE	*Poa secunda*	0–28	–
	sedge	CAREX	*Carex*	0–14	–
	squirreltail	ELEL5	*Elymus elymoides*	0–14	–
	Cusick's bluegrass	POCU3	*Poa cusickii*	0–14	–
Forb					
7	**Perennial, all, dominant**			7–21	
	lupine	LUPIN	*Lupinus*	7–21	–
9	**Other perennial forbs**			7–35	
	common yarrow	ACMI2	*Achillea millefolium*	0–7	–
	agoseris	AGOSE	*Agoseris*	0–7	–
	pussytoes	ANTEN	*Antennaria*	0–7	–
	aster	ASTER	*Aster*	0–7	–
	Indian paintbrush	CASTI2	*Castilleja*	0–7	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–7	–
	fleabane	ERIGE2	*Erigeron*	0–7	–
	buckwheat	ERIOG	*Eriogonum*	0–7	–
	desertparsley	LOMAT	*Lomatium*	0–7	–
	ragwort	SENEC	*Senecio*	0–7	–
Shrub/Vine					
11	**Perennial, evergreen**			70–140	
	little sagebrush	ARAR8	*Artemisia arbuscula*	70–140	–
12	**Perennial, deciduous**			14–35	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–14	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–14	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	0–14	–
Tree					
16	**Perennial, evergreen**			0–14	
	western juniper	JUOC	*Juniperus occidentalis*	0–14	–

Animal community

Livestock Grazing:
This site is suitable for livestock grazing use in the summer and fall under a planned grazing system.
Wildlife:
The site will be used by big game mammals if adequate escape cover is available. Sage grouse will use this site, especially in late summer and early fall.

Hydrological functions

The soils of this site have moderatley slow permeability and have medium to rapid runoff potential. The hydrologic soil group is D.

Other information

Bedrock restrictions rooting depths and limits construction of water impoundments. Special fence designs are necessary due to shallow depths. Settling snowpack may damage fence structures. Allow the soil to drain adequately before grazing to prevent soil compaction and plant damage. Suitability for seeding is poor because of low available water holding capacity and surface rock fragments.

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)	Bob Gillaspy
Contact for lead author	State Rangeland Management Specialist for NRCS in Oregon
Date	03/05/2013
Approved by	Bob Gillaspy
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 few - pedestals

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5-15%

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

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

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

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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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Very shallow, well drained very stony or cobbly clay loams, silty clay loams, or very stony loams (5-12" thick), with up to 60% coarse fragments on the surface; weak fine and medium subangular blocky structure, dry color value 5-6, 3-12 inches thick; moderate OM (2-5%)

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Slight ground cover (20-30%) and gentle to moderate slopes (2-30%) moderately limit rainfall impact and overland flow

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None - claypan at 5-12"

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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: Moderately-deep rooted bunchgrasses

    Sub-dominant: Evergreen shrubs

    Other: Perennial forbs = deciduous shrubs

    Additional:

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

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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: 900, 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