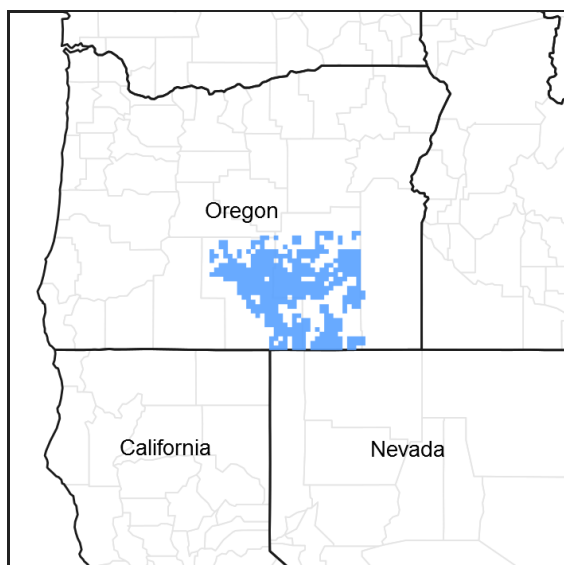


# **Ecological site R023XY300OR** **SOUTH SLOPES 10-12 PZ**

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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.



**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**

R023XY212OR	<b>LOAMY 10-12 PZ</b> Loamy 10-12" PZ
R023XY214OR	<b>CLAYPAN 10-12 PZ</b> Claypan 10-12" PZ

## **Similar sites**

R023XY220OR	<b>CLAYEY 10-12 PZ</b> Clayey 10-12" PZ (less slope)
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i> (2) <i>Achnatherum thurberianum</i>

## **Physiographic features**

This site occurs on south, southeasterly and west-facing exposures of hill and mountain sideslopes. Slopes range from 20 to 70 percent. Elevations range from 4000 to 5500 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Mountain slope
Elevation	1,219–1,676 m
Slope	20–70%
Aspect	SE, S, W

## Climatic features

Annual precipitation is 8 to 12 inches, which primarily occurs in the form of snow during the months of December through March. Spring rains are common. The soil temperature regime is dominantly mesic but can range to frigid. Extreme temperatures are 100 degrees F to -30 degrees F. The frost-free period is about 50 to 90 days. The optimum period for plant growth is from early April to mid-June.

**Table 3. Representative climatic features**

Frost-free period (average)	90 days
Freeze-free period (average)	0 days
Precipitation total (average)	305 mm

## Influencing water features

### Soil features

These soils are shallow to moderately deep to bedrock, well-drained and formed in colluvium and/or residuum. The surface layer is typically loam or clay loam with 15 to over 65 percent rock fragments on the surface, primarily stones and cobbles. The soils, which are moderately deep, are typically medium textured throughout the profile and contain 35 to 70 percent rock fragments. The soils which are shallow to bedrock typically have clay loam or clay subsoils with less than 35 percent rock fragments. The available water holding capacity is about 1 to 5 inches for the profile.

**Table 4. Representative soil features**

Parent material	(1) Residuum–basalt (2) Colluvium–welded tuff
Surface texture	(1) Very stony clay loam (2) Very cobbly sandy loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	25–102 cm
Surface fragment cover ≤3"	13–20%
Surface fragment cover >3"	10–50%
Available water capacity (0–101.6cm)	2.79–11.68 cm
Calcium carbonate equivalent (0–101.6cm)	0%

Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	10–26%
Subsurface fragment volume >3" (Depth not specified)	5–26%

## Ecological dynamics

Range in Characteristics:

The site is dominated by bluebunch wheatgrass, and Wyoming big sagebrush. Vegetative composition is about 75 percent grasses, 5 percent forbs, and 20 percent shrubs.

With an increase in surface rock fragments, Thurber's needlegrass may make up a higher proportion of the stand. The shallower soils of this site commonly occupy the steeper slopes and are lower in production.

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 some 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. Improper 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 minimal 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:

Heavy uncontrolled livestock use, especially in the spring, will result in the loss of vigor and productivity of bluebunch wheatgrass and antelope bitterbrush. Big sagebrush and Sandberg bluegrass may increase. Western juniper may increase in the absence of periodic fire and through competition, reduce soil cover and lead to accelerated soil loss. Cheatgrass, annual mustards, and thistles are likely to invade the site.

## State and transition model

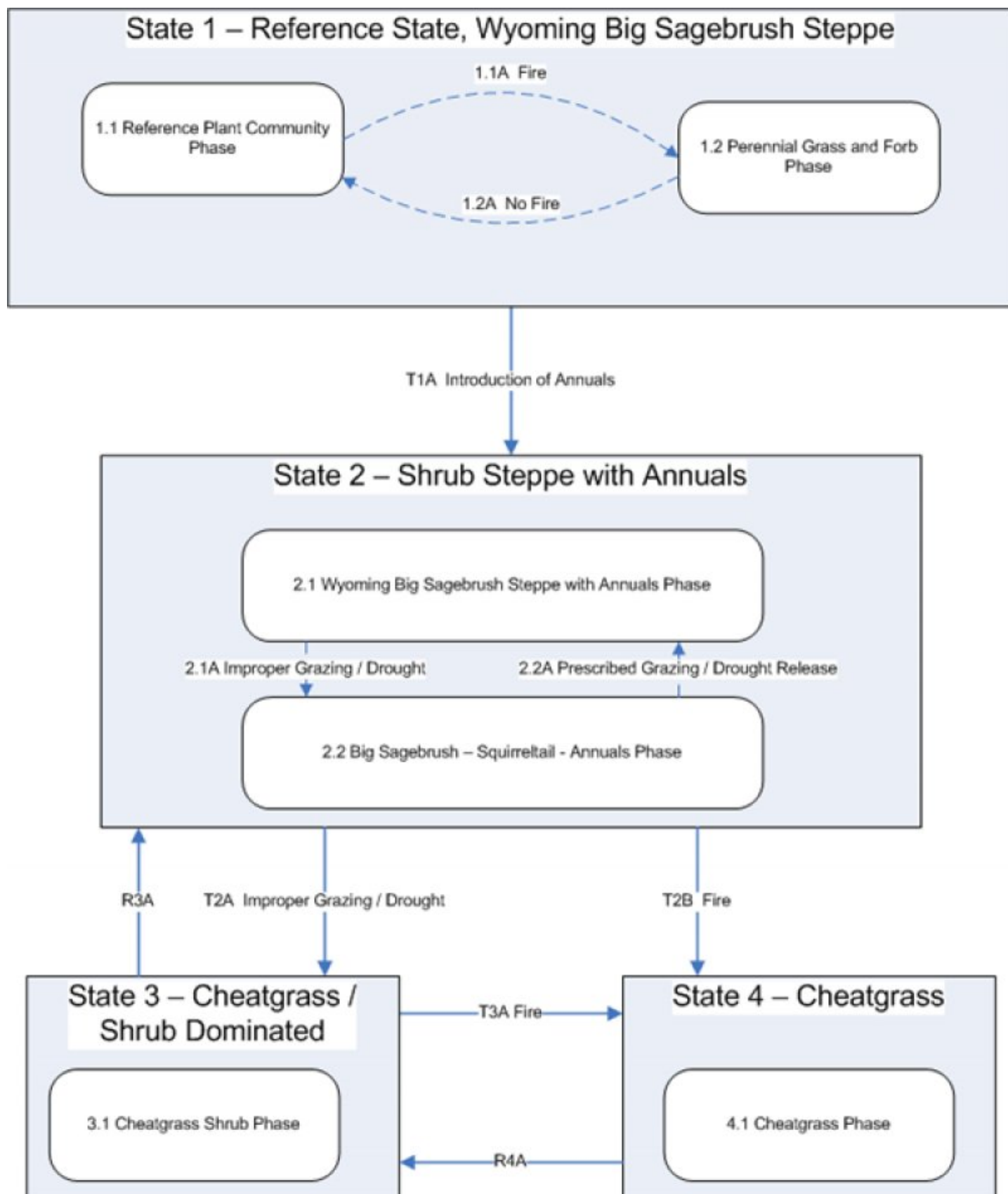


Figure 3. Group 6, STM

## State 1 Reference State

### Community 1.1 Reference Plant Community

The site is dominated by bluebunch wheatgrass, and Wyoming big sagebrush. Vegetative composition is about 75 percent grasses, 5 percent forbs, and 20 percent shrubs. Approximate ground cover is 30 to 45 percent (basal and

crown).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	420	588	757
Shrub/Vine	106	149	192
Forb	28	39	50
Tree	6	8	10
Total	560	784	1009

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Perennial, deep-rooted, dominant</b>			392–628	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	314–471	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	78–157	–
2	<b>Perennial, deep-rooted, sub-dominant</b>			16–39	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	16–39	–
4	<b>Perennial, shallow-rooted, sub-dominant</b>			16–39	
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	16–39	–
5	<b>Other perennial grasses, all</b>			16–63	
	squirreldtail	ELEL5	<i>Elymus elymoides</i>	0–16	–
	thickspike wheatgrass	ELLA3	<i>Elymus lanceolatus</i>	0–16	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	0–16	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–16	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–16	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0–16	–
<b>Forb</b>					
7	<b>Perennial, all, dominant</b>			16–24	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	16–24	–
8	<b>Perennial, all, sub-dominant</b>			8–16	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	8–16	–
9	<b>Other perennial forbs, all</b>			16–39	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–16	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–16	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–16	–
	lupine	LUPIN	<i>Lupinus</i>	0–16	–
	phlox	PHLOX	<i>Phlox</i>	0–16	–
<b>Shrub/Vine</b>					
11	<b>Perennial, evergreen, dominant</b>			55–118	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	39–78	–
	basin big sagebrush	ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	16–39	–
15	<b>Other perennial shrubs, all</b>			16–39	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–16	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–16	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	0–16	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0–16	–
	horsebrush	TETRA3	<i>Tetradymia</i>	0–16	–
<b>Tree</b>					
16	<b>Perennial, evergreen, dominant</b>			0–16	
	western juniper	JUOC	<i>Juniperus occidentalis</i>	0–16	–

## Animal community

## Livestock Grazing:

Warm temperatures and early maturing forage attract livestock to south-facing slopes in early spring. Without a grazing system that will give periodic deferment to desirable plants, there will be a decline in plant vigor and reproduction. Failure to manage livestock on these sites will lead to the loss of any productive value.

## Native Wildlife Associated with the Potential Climax Community:

Mule deer  
Chukar  
Songbirds  
Raptors  
Rodents

The southerly aspect of this site offers warm temperatures and early spring growth that attracts several grazing and browsing forms of wildlife and gallinaceous birds in winter and spring.

## Hydrological functions

The soils of this site have medium infiltration rates and a rapid to very rapid runoff potential. The hydrologic soil groups are B, C, or D.

## Wood products

This site is susceptible to invasion by western juniper. Where this has occurred, the site will yield fence posts, firewood, and other specialty products.

## Other information

Invasion by western juniper and the subsequent competition for moisture will lead to a reduction of soil cover and accelerated soil loss. Improving infiltration and permeability, and reducing runoff should be the immediate goal of juniper control. Livestock will avoid steep stony slopes and increase grazing pressure on adjacent, flatter lands. This should be considered when establishing initial stocking rates.

## 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.

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Date	08/17/2012
Approved by	Bob Gillaspy

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** None, Moderate to severe sheet & rill erosion hazard  
\_\_\_\_\_
2. **Presence of water flow patterns:** None  
\_\_\_\_\_
3. **Number and height of erosional pedestals or terracettes:** None to some  
\_\_\_\_\_
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 to significantly resistant to erosion: aggregate stability = 3-6  
\_\_\_\_\_
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Shallow to moderately deep loam or clay loams with 15-65% 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 (30-45%) and moderate to steep slopes (20-70%) slightly 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 > shrubs > other grasses > forbs

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):** 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: 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, Medusahead, annual mustards, and thistle invade sites that have lost deep rooted perennial grass functional groups.
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17. **Perennial plant reproductive capability:** All species should be capable of reproducing annually
-