USDA Natural Resources
Conservation Service

Ecological site R024XY033OR
ARID NORTH SLOPES 6-10 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.

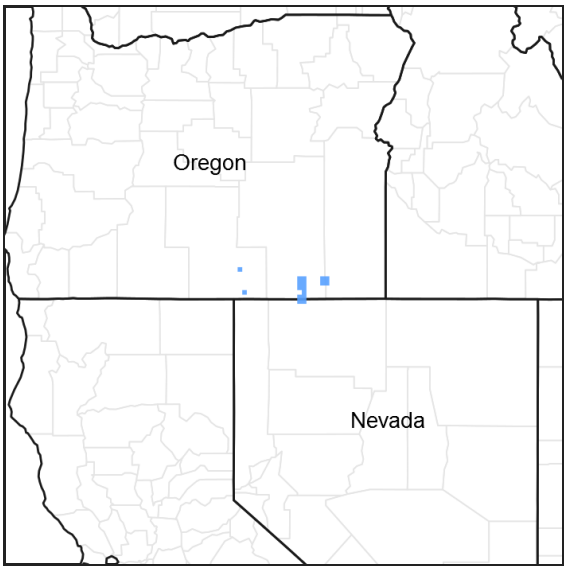

Figure 1. Mapped extent

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

R024XY030OR	**LOAMY SLOPES 6-10 PZ** Loamy Slopes 6-10 PZ (lower production, warmer slope, different composition – ARTRW8 and ACHY dominant w/ACTH7 prominent, PSSPS and GRSP present)
R024XY015OR	**DESERT LOAM 6-10 PZ** Desert Loam 6-10 PZ (non-aspect, lower production, different composition – ATCO and PIDE4 dominant)
R024XY016OR	**LOAMY 8-10 PZ** Loamy 8-10 PZ (non-aspect, different composition – ACTH7 dominant, PSSPS prominent)
R024XY017OR	**SHALLOW LOAM 8-10 PZ** Shallow Loam 8-10 PZ (non-aspect, lower production, different composition – ACTH7 dominant, ACHY and PSSPS prominent)
R024XY020OR	**SHRUBBY LOAM 8-10 PZ** Shrubby Loam 8-10 PZ (non-aspect, different composition - EPHED present, ACTH7 dominant, PSSPS prominent)
R024XY031OR	**DROUGHTY SHALLOW SLOPES 6-10 PZ** Droughty Shallow Slopes 6-10 PZ (lower production, warmer slope, higher soluble salts, different composition – ATCO and PIDE4 dominant, ACHY and ELEL5 prominent)

R024XY032OR	**ARID SOUTH SLOPES 6-10 PZ** Arid South Slopes 6-10 PZ (lower production, warmer slope, different composition – ARTRW8 and ACHY dominant w/ACTH7 prominent, PSSPS and SADO4 present)
R024XY602OR	**NORTH SLOPES 8-10 PZ** North Slopes 8-10 PZ (moderate deep, cobbly ashy loam surface, higher production, cooler slopes, different composition – ARTRW8 and PSSPS dominant w/ACTH7 and POCU3 prominent)
R024XY638OR	**SOUTH SLOPES 8-10 PZ** South Slopes 8-10 PZ (higher production, warmer slope, different composition – ARTRW8 and PSSPS dominant w/ACTH7 near co-dominant)

Similar sites

R024XY638OR	**SOUTH SLOPES 8-10 PZ** South Slopes 8-10 PZ (higher production, warmer slope, different composition – ARTRW8 and PSSPS dominant w/ACTH7 near co-dominant)
R024XY602OR	**NORTH SLOPES 8-10 PZ** North Slopes 8-10 PZ (moderate deep, cobbly ashy loam surface, higher production, cooler slopes, different composition – ARTRW8 and PSSPS dominant w/ACTH7 and POCU3 prominent)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata* (2) *Achnatherum thurberianum*

Physiographic features

This site occurs on north facing aspects of terraces, basin hills and low mountain slopes. Slopes typically range from 20 to 70%. Elevation varies from 3500 to 5200 feet.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Hill (3) Mountain slope
Elevation	3,500–5,200 ft
Slope	20–70%
Aspect	N

Climatic features

The annual precipitation ranges from 6 to 10 inches, most of which occurs in the form of rain and snow during the months of December through March. The soil temperature regime is mesic to frigid near mesic with a mean air temperature of 48 degrees F. Temperature extremes range from 110 to -20 degrees F. The frost free period ranges from 80 to 110 days. The optimum growth period for plant growth is from April through mid June.

Table 3. Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	0 days
Precipitation total (average)	10 in

Influencing water features

Soil features

The soils of this site are typically shallow to very shallow over a strongly cemented duripan, a heavy clay layer or bedrock. Substratum’s can be either compacted alluvial sediments or bedrock. The surface texture is a very gravelly or cobbly sandy clay loam over a very cobbly clay loam subsoil. A desert pavement is common. Permeability is moderately slow to moderate. The available water holding capacity (AWC) is about 2 to 4 inches for the profile. The potential for erosion is high.

Table 4. Representative soil features

Parent material	(1) Volcanic ash–rhyolite
Surface texture	(1) Very cobbly sandy clay loam (2) Extremely stony silty clay loam (3) Very gravelly sandy loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to somewhat poorly drained
Permeability class	Moderately slow to slow
Soil depth	8–20 in
Available water capacity (0-40in)	2–4 in

Ecological dynamics

The reference native plant community is dominated by Wyoming big sagebrush and bluebunch wheatgrass. Thurber's needlegrass is prominent. Spiny hopsage, Indian ricegrass, bottlebrush squirreltail and Sandberg bluegrass are present. Mormon tea is sporadic. Vegetative composition of the community is approximately 70 percent grasses, 10 percent forbs and 20 percent shrubs. The approximate ground cover is 40 to 50 percent (basal and crown).

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: 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. May see a temporary increase in rabbitbrush after fire. Time facilitates the reintroduction of sagebrush. The introduction of invasive annual grasses and forbs transitions into the 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.

Range in Characteristics
The depth to a restrictive layer and aspect influences the composition and production of the site. Production will increase with greater soil depth and at the upper end of the precipitation zone. Bluebunch wheatgrass increases on a silty surface. Thurber's needlegrass increases on shallow coarser soils. Spiny hopsage increases at the lower end of the precipitation zone and on droughty slopes. Mormon tea occurs sporadically increasing on toe slopes and over highly fractured substrata. On older stable higher terraces an erosion pavement has accumulated with a distinctive desert varnish. The distinctive dark color is due to precipitated concentrates of manganese and lesser amounts of iron.

Response to Disturbance - States
If the condition of the site deteriorates as a result of over grazing, bluebunch wheatgrass and Thurber needlegrass will decrease in the stand. Wyoming big sagebrush, squirreltail and Sandberg bluegrass will increase. Minor amounts of annuals will invade. With further deterioration, bare ground rapidly increases, erosion accelerates and site productivity decreases. The invasion of annuals and the natural re-establishment of native perennials are limited on eroded surfaces and in areas of dense cobbles and heavy erosion pavement.

States: ARTRW8-GRSP/ELEL5-POSE-bare ground with erosion pavement; Annuals (scattered)-bare ground with erosion pavement

State and transition model

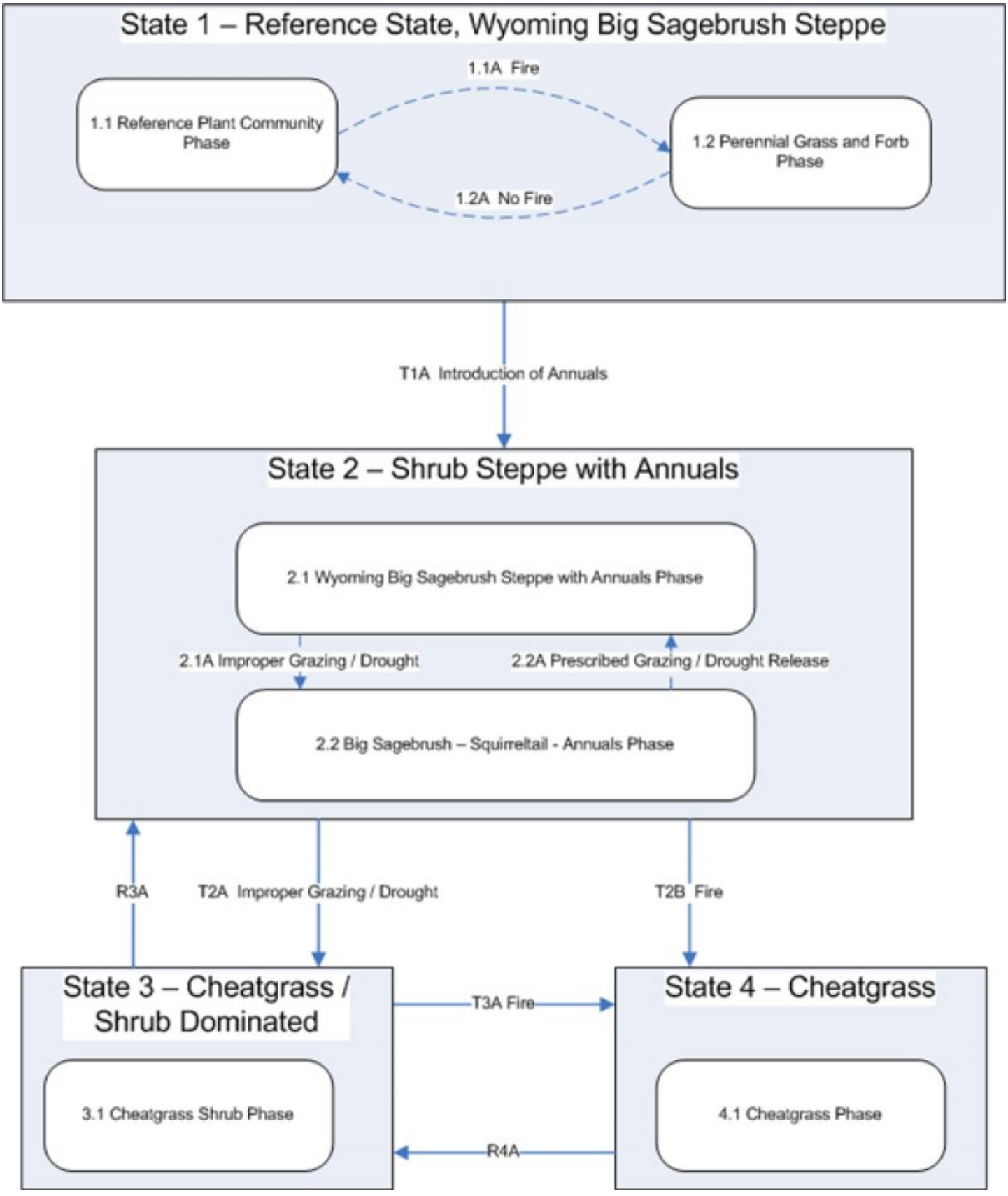

Figure 2. Group 6, STM

State 1
Reference State

Community 1.1
Reference Plant Community

The reference native plant community is dominated by Wyoming big sagebrush and bluebunch wheatgrass.

Thurber's needlegrass is prominent. Spiny hopsage, Indian ricegrass, bottlebrush squirreltail and Sandberg bluegrass are present. Mormon tea is sporadic. Vegetative composition of the community is approximately 70 percent grasses, 10 percent forbs and 20 percent shrubs. The approximate ground cover is 40 to 50 percent (basal and crown).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	280	420	560
Shrub/Vine	80	120	160
Forb	40	60	80
Total	**400**	**600**	**800**

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	**Dominant, moderate rooted bunchgrass**			240–300	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	240–300	–
2	**Sub-dominant, moderate rooted bunchgrass**			120–240	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	120–240	–
3	**Other Perennial Grasses**			50–120	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	12–30	–
	squirreltail	ELEL5	*Elymus elymoides*	0–12	–
	basin wildrye	LECI4	*Leymus cinereus*	0–12	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–12	–
	foxtail wheatgrass	PSSA2	*×Pseudelymus saxicola*	0–12	–
Forb					
4	**Perennial forbs**			12–60	
	common yarrow	ACMI2	*Achillea millefolium*	0–12	–
	pussytoes	ANTEN	*Antennaria*	0–12	–
	rockcress	ARABI	*Arabidopsis*	0–12	–
	milkvetch	ASTRA	*Astragalus*	0–12	–
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	0–12	–
	mariposa lily	CALOC	*Calochortus*	0–12	–
	Indian paintbrush	CASTI2	*Castilleja*	0–12	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–12	–
	fleabane	ERIGE2	*Erigeron*	0–12	–
	buckwheat	ERIOG	*Eriogonum*	0–12	–
	lupine	LUPIN	*Lupinus*	0–12	–
	spreading phlox	PHDI3	*Phlox diffusa*	0–12	–
	deathcamas	ZIGAD	*Zigadenus*	0–12	–
Shrub/Vine					
5	**Evergreen Shrub**			60–90	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	60–90	–
6	**Other shrubs**			24–66	
	mormon tea	EPVI	*Ephedra viridis*	0–60	–
	spiny hopsage	GRSP	*Grayia spinosa*	12–30	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	0–12	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–12	–

Animal community

Livestock Grazing
This site has limited suitabity for livestock grazing use in the late spring and fall under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction. Care should be taken to avoid plant crown damage and soil movement when the soils are wet. The shallow soils on the steep slopes of this site are very susceptible to movement and compaction from hoof action. Grazing management should be keyed to bluebunch wheatgrass and Thurber needlegrass. These bunchgrasses can be severely

damaged if heavily grazed during periods of flowering and grass seed formation before root reserves have accumulated and soil moisture is low. Deferred grazing or rest is recommended at least once every three years.

Wildlife
This site offers food and cover for mule deer, antelope, desert bighorn sheep and a variety of birds, rodents and associated predators. It is an important spring, fall and winter use area for mule deer,antelope and desert bighorn sheep.

Hydrological functions

The soils of this site have a high runoff potential because of low intake rates, low water holding capacity, shallow depths and steep slopes. Hydrologic cover is fair to good when the bluebunch wheatgrass and Thurber needlegrass components are greater than 70 percent of potential. The soils are in hydrologic group D.

Other information

This site has virtually no potential for range seeding because it is steep, very droughty and usually has a stony surface. Extended drought can inhibit germination and establishment of presently available species. In areas where dense cobbles and a heavy erosion pavement exist, the potential for natural seeding re-establishment is low.

Contributors

J.Joye(OSU)
NRCS/BLM Team - Vale (up-date)
Range Soils Team
SCS/BLM Team, Hines
SCS/BLM Team, Hines (1985 & 1994)

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	
Approved by	
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):**

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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:**

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17. **Perennial plant reproductive capability:**
