

Ecological site group R007XG153WA

Cool Loamy

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Key Characteristics

None specified

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.

Physiography

A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area (MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are likely to be refined into more precise group during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

Hierarchical Classification

Major Land Resource Area (MLRA): 007X – Columbia Basin

LRU – Common Resource Areas (CRA):

7.1 – Sandy Missoula Flood Deposits

7.2 – Silty Missoula Flood Deposits

7.4 – Dry Yakima Folds

7.5 – Yakima Valley – Pleistocene Lake Basins

Site Concept Narrative:

Diagnostics:

Cool Loamy ecological site in MLRA 007X is much more limited in extent than the Cool Loamy ecological site in MLRA 008X.

This site is confined to north to north-east facing slopes on Saddle Mountain and Frenchman Hills at elevations of 1500 to 2000 feet. Cool Loamy ecological site is also found on the MLRA 007X portions of Rattlesnake Hills, Horse Heaven Hills and Beazley Hills, again on north to northeast slopes. Below 8 inches of precipitation, the Cool Loamy ecological site may be virtually nonexistent even on north aspects.

This is an upland site occurring on 20 inches and deeper loamy soils. These sites occur most commonly on silt loam, sandy loam and stony loam soils.

Cool Loamy ecological site in MLRA 007X has less threetip sage, less Idaho fescue, but more bluebunch wheatgrass than Cool Loamy in MLRA 008X. The shrub layer is generally a mixture of Wyoming big sagebrush, threetip sagebrush, horsebrush and rabbitbrush. The cover of Wyoming and basin big sagebrush will depend on

how long it has been since the site burned. Bluebunch wheatgrass dominates the herbaceous layer with Idaho fescue a minor to co-dominant species.

Carey balsamroot is a common marker for MLRA 007X (less than 9 inches of precipitation).

Principle Vegetative Drivers:

The vegetative expression of this productive site is driven by two factors: (1) moderately deep to deep soil depth provides unrestricted rooting for most species, and (2) the microclimate which allows the shift in major plant species. With higher elevations or northerly facing slopes this ecological site has cooler temperatures year-round and longer lasting snowpack than other MLRA 007X ecological sites. This site provides crucial water to the vegetation at the hottest time of the growing season allowing the ecological site more resilience when impacted by disturbances. Also, being wetter and cooler, Cool Loamy ecological site supports a denser plant cover than the Loamy ecological site.

INFLUENCING WATER FEATURES

A plant's ability to grow on a site and overall plant production is determined by soil-water-plant relationships

1. Whether rain and melting snow runs off-site or infiltrates into the soil
2. Whether soil condition remain aerobic or become saturated and become anaerobic
3. Water drainage and how quickly the soil reaches wilting point

Cool Loamy ecological site has cooler temperatures and longer lasting snow than other MLRA 008X ecological sites. Thus, this site supports a denser plant cover and provides water crucial to vegetation when it becomes hot.

Physiographic features:

The landscape is part of the Columbia basalt plateau. Cool Loamy sites are most commonly found on broad ridges, benches and plateaus, stream terraces, drier draw bottoms, north and northeast-facing hillslopes and in small basins

Physiographic Division: Intermontane Plateau

Physiographic Province: Columbia Plateau

Physiographic Sections: Walla Walla Plateau Section

Landscapes: Basin and hills

Landform: Terraces, hillslopes, footslopes, nose slopes

Elevation:

Range: 220 to 3,500 feet

Central tendency: 1,500 to 2,000 feet

Slope:

Range: 0 to 60 percent

Central tendency: 2 to 30 percent

Aspect: Dominantly northern slopes.

Geology:

This is almost entirely underlain by Miocene basalt flows. Columbia River basalt is covered in most areas with as much as 200 feet of eolian, lacustrine, and alluvial deposits. This basin generally corresponds to the vast temporary lakes created by floodwaters from glacial Lakes Missoula and Columbia. Most of the fluvial and lacustrine sediments were deposited about 16,000 years ago, when an ice dam on the ancient Columbia River burst and when glacial Lake Missoula periodically emptied, creating catastrophic floods.

Climate

MLRA 007X is the lowest, driest and hottest portions of the entire Columbia River region and the sagebrush-bluebunch wheatgrass zone. Areas with threetip sagebrush and Idaho fescue when compared to Wyoming big sagebrush-bluebunch wheatgrass regions, are cooler from late-fall to early-spring (October through April), and has higher precipitation and precipitation-transpiration for five months (September, November, December, January and

March) (Daubenmire).

The climate across MLRA 007X is characterized by moderately cold, wet winters, and hot, dry summers, with limited precipitation due to the rain shadow effect of the Cascades. The average annual precipitation for Cool Loamy ecological site is mostly between 6 and 10 inches. Seventy to seventy-five percent of the precipitation comes late October through March as a mixture of rain and snow. For Cool Loamy, March-May rains ensure good production and seed formation for Idaho fescue. June through early October is dry. Freezing temperatures generally occur from late-October through early-April. Temperature extremes are -10 degrees Fahrenheit in winter and 110 degrees Fahrenheit in summer. Winter fog is variable and often quite localized, as the fog settles on some areas but not others.

Mean Annual precipitation

Range: 6 - 10 inches

Soil moisture regime is aridic.

Mean Annual Air Temperature

Range: 46 to 54 F

Central Tendency: 48 – 52 F

Soil temperature regime is mesic.

Frost-free period (days)

Total range: 115 to 200

Central tendency: 140 to 170

The growing season for Cool Loamy ecological site is March through June.

Soil features

Edaphic:

The Cool Loamy ecological site occurs with Loamy, Stony and Very Shallow ecological sites.

REPRESENTATIVE SOIL FEATURES

This ecological site components are dominantly Xeric taxonomic subgroup of Haplocambids great group of the Aridisols taxonomic orders. Soils are dominantly deep and very deep. Average available water capacity of about 7.0 inches (17.8 cm) in the 0 to 40 inches (0 to 100 cm) depth range.

Soil parent material is dominantly loess.

The associated soils are Adkins, Royal, Shano and similar soils.

Dominant soil surface is silt loam to very fine sandy loam.

Dominant particle-size class is coarse-silty.

Fragments on surface horizon > 3 inches (% Volume):

Minimum: 0

Maximum: 2

Average: 0

Fragments within surface horizon > 3 inches (% Volume):

Minimum: 0

Maximum: 5

Average: 0

Fragments within surface horizon \leq 3 inches (% Volume):

Minimum: 0

Maximum: 10

Average: 2

Subsurface fragments > 3 inches (% Volume)

Minimum: 0

Maximum: 5

Average: 1

Subsurface fragments \leq 3 inches (% Volume):

Minimum: 0

Maximum: 20

Average: 5

Drainage Class: Dominantly well drained.

Water table depth: Dominantly greater than 60 inches

Flooding:

Frequency: None

Ponding:

Frequency: None

Saturated Hydraulic Conductivity Class:

0 to 10 inches: Moderately high

10 to 40 inches: Moderately high

Depth to root-restricting feature (inches):

Minimum: Dominantly greater than 60 inches

Maximum: Greater than 60

Electrical Conductivity (dS/m)

Minimum: 0

Maximum: 2

Sodium Absorption Ratio

Minimum: 0

Maximum: 0

Calcium Carbonate Equivalent (percent):

Minimum: 0

Maximum: 15

Soil Reaction (pH) (1:1 Water):

0 - 10 inches: 6.6 to 8.4

10 - 40 inches: 6.6 to 8.4

Available Water Capacity (inches, 0 – 40 inches depth)

Minimum: 2.7

Maximum: 8.3

Average: 7.0

Vegetation dynamics

ECOLOGICAL DYNAMICS:

Idaho fescue is dominant on Cool Loamy ecological site in MLRA 008X. Not so in MLRA 007X, where Idaho fescue is at best codominant to subdominant.

Vegetation Dynamics:

Cool Loamy ecological site produces about 800 to 1200 pounds per acre of biomass annually.

On MLRA 008X Cool Loamy ecological sites, Idaho fescue and threetip sagebrush are dominant species. MLRA

007X is enough drier so that Cool Loamy ecological site is far more restricted on the landscape and Idaho fescue and threetip sagebrush are not as prominent in the plant community.

Compared to other upland ecological sites in MLRA 007X, Cool Loamy has more available soil moisture. This happens twofold: (1) there is more moisture (more spring rain, deeper snowpack, more fog), and (2) the precipitation is more effective (cooler temperatures, less runoff and less evaporation due to closer spacing of plants, and hence, more soil cover). Threetip sagebrush and Idaho fescue are especially linked to the additional soil moisture on this ecological site. The third dominant species in the Reference State, bluebunch wheatgrass, is not as linked to the additional soil moisture.

Threetip sagebrush is a short, shallow-rooted, evergreen shrub. Leaves are more deeply lobed than big sagebrush. Compared to big sagebrush, threetip sagebrush grows on sites that are moister or at higher elevations. Threetip sagebrush has a very slow growth rate, reaching a height of one foot after twenty years. In Washington threetip sagebrush generally sprouts following fire but it is not a big-time sprouter like rabbitbrush. It can take years for threetip sagebrush to get back to pre-burn conditions.

Idaho fescue is shorter and has a dense clump of shoots, while bluebunch wheatgrass is taller and is less dense. Both species are long-lived bunchgrasses. Bluebunch has an awned or awnless seed head arranged in a spike, while Idaho fescue has an awned seed head arranged in a panicle. The ratio of Idaho fescue to bluebunch wheatgrass plants on any site can vary due to aspect and elevation.

Both grasses provide a crucial and extensive network of roots to the upper portions (up to 48 inches deep in soils with no root-restrictive horizons) of the soil profile. These roots create a massive underground source to stabilize the soils, provide organic matter and nutrients inputs, and help maintain soil pore space for water infiltration and water retention in the soil profile. The extensive rooting system of mid-sized bunchgrasses leave very little soil niche space available for invasion by other species. This drought resistant root can compete with, and suppress, the spread of exotic weeds.

The stability and resiliency of the reference communities is directly linked to the health and vigor of Idaho fescue and bluebunch wheatgrass. More details about bunchgrass physiology included later. Research has found that the community remains resistant to medusahead invasion if the site maintains at least 0.8 plants per square foot of mid-sized bunchgrass (K. Davies 2008). These two bunchgrasses hold the system together. If we lose either or both bunchgrass the ecosystem begins to unravel.

The natural disturbance regime for grassland communities is periodic lightning-caused fires. The fire return intervals (FRI) listed in research for sagebrush steppe communities is quite variable. Ponderosa pine communities have the shortest FRI of about 10-20 years (Miller). The FRI increases as one moves to wetter forested sites or to drier shrub steppe communities. Given the uncertainties and opinions of reviewers, a mean of 75 years and a range of 50 to 100 years was chosen for Wyoming big sagebrush communities (Rapid Assessment Model). Threetip sagebrush-Idaho fescue areas should have a comparable fire return interval.

Some fires are spotty or do not burn hot enough to fully remove the sagebrush. Fires with light severity will remove less sagebrush and open smaller patches for grass and forb recovery, whereas the more severe fires will remove almost all the sagebrush and leave vast areas open to return to bunchgrass dominance. This is how the patchy distribution occurs. Rabbitbrush and horsebrush are sprouting shrubs and may also increase following fire.

The effect of fire on the main species is mixed for the Cool Loamy site. Threetip sagebrush in Central Washington sprouts from lateral roots or the root crown following fire and bluebunch wheatgrass is fire tolerant. Threetip sagebrush is also a vigorous, wind-dispersed seeder and in many cases, after fire, threetip sagebrush will both re-sprout and disperse new seed from the surviving plants. Both species recover quickly. But Idaho fescue is much more sensitive to fire. Under windy conditions, a fire can burn into the crown of Idaho fescue, leaving behind "black holes" or nothing but ash. When a site loses Idaho fescue, the holes will be filled by vigorous native species or exotic weeds. Threetip sagebrush and bluebunch wheatgrass keeps the site resistant to change, while Idaho fescue makes the site more at risk.

A severe fire puts stress on the entire community. The sagebrush layer is completely removed. Spots or patches with heavy sagebrush are sterilized by the fire and must be seeded to prevent invasive species (annual grasses, tumble mustard) from totally occupying the site. Bluebunch wheatgrass and basin wildrye will have weak vigor for a

few years but generally survive. Idaho fescue plants are very much at risk with a severe burn coupled with wind. The result can be “black holes” or ash two to three inches into the crown. The death of Idaho fescue plants creates holes in the community, and the opportunity for exotic species to colonize. Needle and thread is one native species that can increase via new seedlings.

Idaho fescue and bluebunch wheatgrass exhibit rapid tillering when there is light severity fires and favorable soil moisture. But, the longer the site goes without fire and the more grazing pressure added, the more threetip sagebrush cover increases and the bunchgrasses decline.

Grazing is another common disturbance that occurs to this ecological site. Grazing pressure can be defined as heavy grazing intensity, or frequent grazing during reproductive growth, or season-long grazing (the same plants grazed more than once). As grazing pressure increases the plant community unravels in stages:

1. Idaho fescue declines while bluebunch wheatgrass and threetip sagebrush increase
2. Both Idaho fescue and bluebunch wheatgrass decline while threetip sagebrush and threadleaf sedge increase
3. With further decline invasive species colonize the site
4. The site can become a threetip sagebrush-threadleaf sedge community

Managing sagebrush steppe to improve the vigor and health of native bunchgrasses begins with an understanding of grass physiology. New growth each year begins from basal buds. Given the opportunity Idaho fescue readily produces new seedlings while bluebunch wheatgrass plants rely principally on tillering. During seed formation, the growing points of bluebunch wheatgrass become elevated and are vulnerable to damage or removal. Idaho fescue has weak stems and is much more sensitive to grazing than bluebunch wheatgrass.

If defoliated during the formation of seeds, bluebunch wheatgrass has limited capacity to tiller compared with other, more grazing resistant grasses (Caldwell et al., 1981). Repeated critical period grazing is especially damaging. Over several years each native bunchgrass pasture should be rested during the critical period two out of every three years (approximately April 15 – July 15). And each pasture should be rested the entire growing-season every third year (approximately March 1 – July 15).

In the spring each year it is important to monitor and maintain an adequate top growth: (1) so plants have enough energy to replace basal buds annually, (2) to optimize regrowth following spring grazing, (3) to protect the elevated growing points of bluebunch wheatgrass, and (4) to avoid excessing defoliation of Idaho fescue with its weak stems.

These grasses remain competitive if:

- (1) Basal buds are replaced annually,
- (2) Enough top-growth is maintained for growth and protection of growing points, and
- (3) The timing of grazing and non-grazing is managed over a several-year period. Careful management of late spring grazing is especially critical

For more grazing management information refer to Range Technical Notes found in Section I Reference Lists of NRCS Field Office Technical Guide for Washington State.

In Washington, threetip sagebrush – Idaho fescue/bluebunch wheatgrass communities provide habitat for a variety of upland wildlife species.

Supporting Information:

Associated Sites:

Cool Loamy ecological site is associated with other sites in MLRA 007X including, Loamy, Stony and Very Shallow ecological sites.

Similar sites:

Cool Loamy ecological site in MLRA 007X has sagebrush with bluebunch wheatgrass and Idaho fescue. In MLRA 008X, the Cool Loamy ecological site has more Idaho fescue and threetip sagebrush.

North Aspect grassland in MLRA 8 Columbia Plateau, and North Aspect bunchgrass in MLRA 9 Palouse Prairie do not have threetip sagebrush but otherwise are similar

Inventory Data References (narrative):

Data to populate Reference Community came from several sources: (1) NRCS ecological sites from 2004, (2) Soil Conservation Service range sites from 1980s and 1990s, (3) Daubenmire's habitat types, and (4) ecological systems from Natural Heritage Program

State Correlation: Washington

References:

Boling M., Frazier B., Busacca, A., General Soil Map of Washington, Washington State University, 1998

Daubenmire, R., Steppe Vegetation of Washington, EB1446, March 1968

Davies, Kirk, Medusahead Dispersal and Establishment in Sagebrush Steppe Plant Communities, Rangeland Ecology & Management, 2008

Environmental Protection Agency, map of Level III and IV Ecoregions of Washington, June 2010

Miller, Baisan, Rose and Pacioretty, "Pre and Post Settlement Fire regimes in mountain Sagebrush communities: The Northern Intermountain Region

Natural Resources Conservation Service, map of Common Resource Areas of Washington, 2003

Rapid Assessment Reference Condition Model for Wyoming sagebrush, LANDFIRE project, 2008

Rocchio, Joseph & Crawford, Rex C., Ecological Systems of Washington State. A Guide to Identification. Washington State Department of Natural Resources, October 2015. Pages 156-161 Inter-Mountain Basin Big Sagebrush

Rouse, Gerald, MLRA 8 Ecological Sites as referenced from Natural Resources Conservation Service-Washington FOTG, 2004

Soil Conservation Service, Range Sites for MLRA 8 from 1980s and 1990s

Tart, D., Kelley, P., and Schlafly, P., Rangeland Vegetation of the Yakima Indian reservation, August 1987, YIN Soil and Vegetation Survey

Site Development and Testing Plan

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

Major Land Resource Area

MLRA 007X
Columbia Basin

Subclasses

- R007XY153WA–Cool Loamy

Stage

Provisional

Contributors

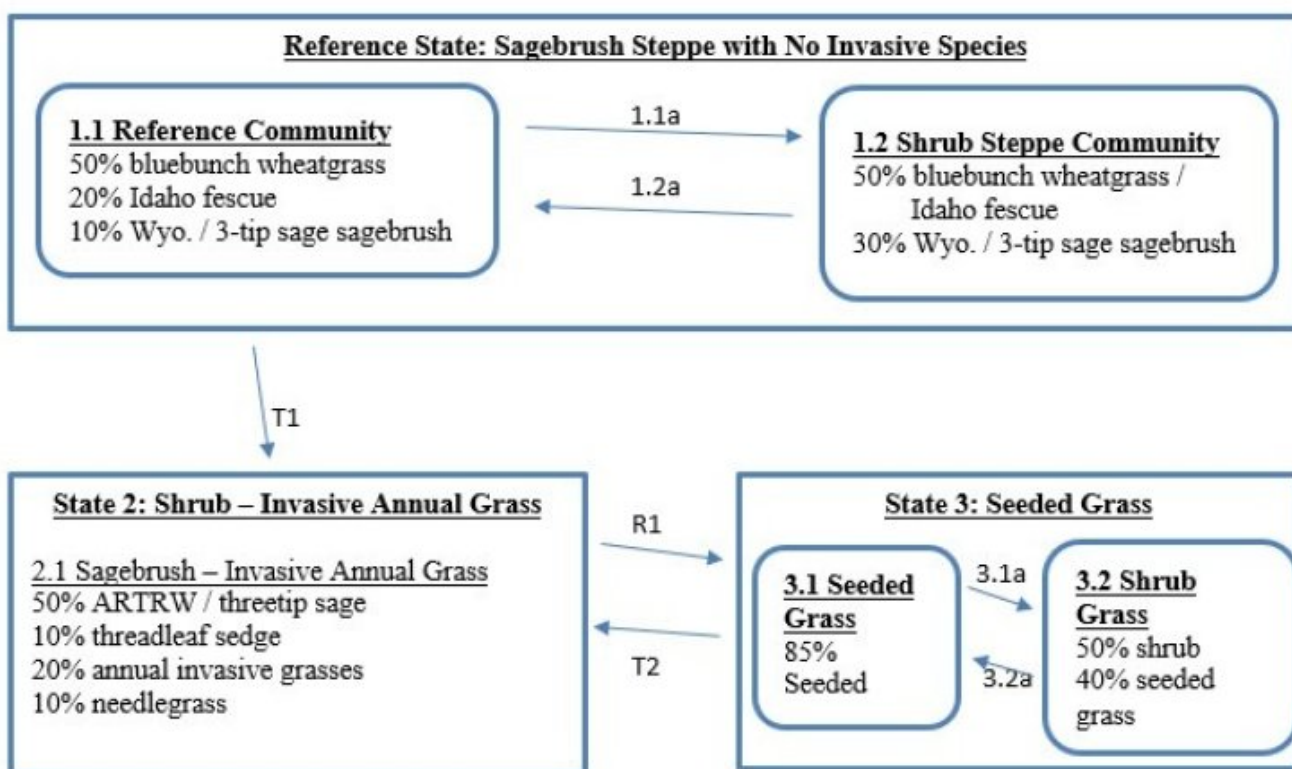
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State and transition model

State and Transition Diagram for Cool Loamy:

This state and transition model (STM), explains the general ecological dynamics for the Cool Loamy ecological site. The STM illustrates the common plant communities that can occur on the site. Boxes around each state represent the ecological threshold, which if crossed, is not reversible without human intervention. Arrows within a state represent the pathway between plant communities, while the arrows between states represent the transition or recovery between the states. Plant species composition is represented as a percentage of total annual production (pounds). The composition of pristine sites can vary somewhat due to variations in site conditions.



Reference Community 1.1 for Cool Loamy in MLRA 7

Plant species composition is represented as a percentage of total annual production (pounds). The composition of pristine sites can vary somewhat due to variations in site conditions.

Pounds listed below are the maximum allowable for Similarity Index. Many numbers have been rounded to not show more precision than our current state of knowledge.

Note: on Cool Loamy in MLRA 7, Wyoming sagebrush is more prevalent than threetip sage.

Similarity Index		Similarity Index	
Non-Sprouting Shrubs – Subdominant		Sprouting Shrubs – Minor	
10% 85 lbs.		(3-7% canopy)	
ARTRW8	Wyoming sagebrush	ARTR4	three-tip sage
		CHRY5	rabbitbrush
		TECA2	horsebrush
		ERIOG	buckwheat
		5% 45 lbs.	
Dominant Mid-Size Bunchgrasses		Other Mid-Size Bunchgrasses – Minor	
PSSP6	bluebunch wheatgrass	5% 45 lbs.	
FEID	Idaho fescue	ELEL5	bottlebrush squirreltail
	50% 450 lbs.	ACTH7	Thurber needlegrass
	20% 200 lbs.	HECO26	needle and thread
Short Grass – Minor		Grass like – Trace	
5% 45 lbs.			
POSE	Sandberg bluegrass	CAFI	threadleaf sedge
		Trace	
Native Forbs – Minor		5% 45 lbs.	
BACA3	Carey's balsamroot	MICRO	microseris
LUPIN	lupine	ALLIU	wild onion
CREPI	hawksbeard	CALOC	Mariposa lily
PHLO2	longleaf phlox	ERIGE2	fleabane
PHHO	spiny phlox	LIPU11	granite gilia
LOMAT	lomatum / biscuitroot	ERIOG	buckwheat
ASTRA	milkvetch / locoweed	CASTI2	paintbrush
ANDI2	low pussytoes	COLLO	collomia
PLPA2	woolly plantain	LIRU4	stoneseed
ACMI2	yarrow		
		Below	Normal
Estimated Production (pounds / acre)		600	700
			Above
			850

State 1

Reference State

Reference State for Cool Loamy Ecological Site Sagebrush Steppe (Fire-Tolerant Shrubs) State 1 Narrative: State 1 represents sagebrush steppe with no invasive or exotic species. All the functional, structural groups have one or more species. Reference State Community Phases: 1.1 Reference Bluebunch wheatgrass-Idaho fescue / Sagebrush (Wyoming big & Threetip) 1.2 Shrub Steppe Wyoming big and Threetip sagebrush / Idaho fescue-bluebunch wheatgrass Communities 1.1 and 1.2 are stable with a high cover of bluebunch wheatgrass/Idaho fescue and low to moderate cover of Wyoming big or threetip sagebrush. Both communities have a minor amount of threadleaf sedge which is native, but also rhizomatous. But when the dominant bunchgrasses exhibit low vigor and

decline, sagebrush and threadleaf sedge increase and Japanese brome colonizes the disturbed sites. Dominate Reference State Species: Bluebunch wheatgrass, Idaho fescue, sagebrush (Wyoming big/threetip) At-risk Communities: • All communities in the reference state are at risk of invasive species. The seed source for Japanese brome or other invasive annual seed blows onto most sites annually. • Any community becomes at-risk of moving to State 3 when bluebunch wheatgrass and Idaho fescue have low vigor, the cover of sagebrush is expanding, and Japanese brome has colonized the site. • Any community is at risk when fire kills the Idaho fescue plants. The holes could quickly be filled by Japanese brome, cheatgrass or threadleaf sedge. The site should be inter-seeded that fall or early the following spring

Community 1.1

Reference community

Community 1.2

Shrub Steppe

Pathway P1.1a

Community 1.1 to 1.2

1.1a Result: shift from reference community to shrub steppe community. Moderate reduction in bunchgrasses and a moderate increase in threetip sagebrush Primary Trigger: grazing pressure (heavy grazing intensity, season long grazing or frequent late spring grazing) coupled with a period of no fire, give shrubs the competitive edge. Ecological process: Consistent defoliation pressure to Idaho fescue and bluebunch wheatgrass results in poor vigor and shrinking crowns. Sagebrush sets new seedlings and expands. Indicators: decrease in Idaho fescue and bluebunch wheatgrass cover coupled with new sagebrush seedlings.

Pathway P1.2a

Community 1.2 to 1.1

1.2a Result: shift from shrub steppe community to reference community. Sagebrush declines while bunchgrasses increase Primary Trigger: Moderate severity fire kills Wyoming big sagebrush and sets threetip sagebrush back while perennial bunchgrasses expand given the opportunity and good vigor both pre- and post-fire. Also, the fire would need to not burn into the root crown of Idaho fescue. Ecological process: Idaho fescue and other bunchgrasses have good vigor post-fire and expand via tillering and new seedlings.

State 2

Shrub - Invasive Annual Grass

State 2 Narrative: State 2 represents a shrub-invasive annual grass community. Many native functional, structural groups have been altered or are missing. Annual grasses such as Japanese brome are present but secondary to the shrub and sedge components. Community Phases for State 2: 2.1 Shrub-Invasive Annual grass Sagebrush – Invasive Annual Grasses In Community 2.1, the dominant bunchgrasses of State 1 have declined significantly, while sagebrush has increased. Also, annual bromes have colonized the disturbed site and become an important component. Dominate Species in State 2: Threadleaf sedge, threetip sagebrush, invasive annual grasses

Community 2.1

Shrub-Invasive Annual grass

State 3

Seeded Grass

Narrative for State 3: State 3 represents sites that have been seeded. The site was no longer productive for intended uses. So, a commitment was made to kill existing stand and seed more desirable species. Community Phases for State 3: 3.1 Seeded grasses 3.2 Shrub – Seeded Grasses Refer to narrative for R1 under Recovery on page 13. Dominate Species in State 2: Desirable seeded grass species with or without legumes

Community 3.1

Seeded grasses

Community 3.2

Shrub – Seeded Grasses

Pathway P3.1a

Community 3.1 to 3.2

3.1a Seeded grass community shifts to a shrub-grass community. Primary Trigger: heavy grazing pressure to the desirable grasses put them in decline while the shrubs increase. Ecological Process: consistent defoliation pressure to desirable seeded species results in poor vigor, shrinking crowns and mortality. The shrub layer expands and becomes co-dominant via new seedlings.

Pathway P3.2a

Community 3.2 to 3.1

3.2a Shrub-grass community shifts back to seeded grass community Primary Trigger: If the stand still has a good stand of bunchgrasses, shrubs are controlled by chemical treatment. Bunchgrasses will need good plant vigor pre- and post-treatment. Fire conditions and post-fire grazing management allows Idaho and bluebunch wheatgrass to thrive and expand. Ecological Process: fire kills the Wyoming sagebrush and sets threetip sagebrush back which releases resources. Bunchgrasses thrive and expand via tillering or new seedlings.

Transition T1

State 1 to 2

T1 Transition from Reference State to State 2 (sagebrush – invasive annual grass). The Reference State has only a minor amount of threadleaf sedge and no invasive species. In State 2 sagebrush and invasive annual grasses become dominant. Primary Trigger: Heavy grazing pressure (heavy grazing intensity, season-long grazing or frequent late-spring grazing) on bluebunch wheatgrass and Idaho fescue. Also, soil disturbances by rodents and badgers allow annual grasses to colonize. Ecological process. Consistent defoliation pressure (heavy grazing, season long grazing or frequent late spring grazing) The cover of sagebrush increases, and invasive annual grasses have colonized the site and become prominent. Indicators: increasing gaps between dominant bunchgrasses (bluebunch wheatgrass and Idaho fescue). Expanding cover of sagebrush and invasive species.

Restoration pathway R1

State 2 to 3

R1 Transition for State 3 annuals and State 4 seeded. This restoration transition does not occur without significant time and inputs to control weeds, prepare a seedbed, seed desirable species, and post-seeding weed control and management. This requires a commitment of two years or more to kill threadleaf sedge and for weed control. Care must be taken to maintain soil structure so that the seedbed has many safe sites for the seed. Seed placement must be managed to achieve seed-soil contact at very shallow depth (about 1/8 inch is desired). Proper grazing management is essential to maintain the stand post-seeding. Secar Snake River wheatgrass, thickspike wheatgrass, Sherman big bluegrass, Sandberg bluegrass, and crested or intermediate wheatgrass are typical species seeded on Cool Loamy ecological site. The actual transition occurs when the seeded species have successfully established and are outcompeting the threadleaf sedge, shrubs and annual species for cover and dominance of resources.

Transition T2

State 3 to 2

T2 Transition from State 3 seeded grasses to State 2 sagebrush – annual grasses. This transition occurs when the cover of seeded grasses drops to less than 10% and invasive annual grasses have assumed a dominant position in the community. Primary trigger: heavy grazing pressure (heavy grazing intensity, season long grazing or frequent late spring grazing) reduces the vigor of the desirable seeded species. Ecological process: consistent defoliation pressure to desirable seeded grasses results in poor vigor, shrinking crowns and mortality. The competitive edge has shifted from seeded grasses to shrubs and annual grasses. Indicators: Declining cover for the seeded species.

Increasing canopy gaps between desirable seeded species. Increasing cover of sagebrush and invasive species.

Citations