# 10720
# Wyoming Basins Dwarf Sagebrush Shrubland and Steppe

BpS Model/Description Version: Aug. 2020

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**Vegetation Type**
Shrubland

**Map Zones**
22, 29

**Geographic Range**
In map zone (MZ) 22, this type occurs in all sections of the MZ.

Found in western Colorado, eastern Utah, northwestern Wyoming, western Montana, southcentral Montana (at base of Beartooth on east side; between Beartooth and Pryor Mtns.), southern Idaho, and southeastern Oregon.

In MZ29, this type occurs in the Casper Mountain area, along the slopes of the Bighorn Mountains and into the Pryor Mountains. It occurs in subsections 342Ad, 331N -- just on the fringes of MZ29.

**Biophysical Site Description**
Very heavy, montmorillonite (smectite) clay soils with some coarse fragments, usually effectively very shallow to a hard clay pan, not deep enough to support either big sagebrush or deep-rooted grasses. Usually poorly drained.

Soils may be too dense and poorly drained for *Artemisia arbuscula* (little sagebrush) but not for *Artemisia nova* (black sagebrush). Black sagebrush generally occupies medium- to coarse-textured soils, often with a large volume of rock fragments. Those two sagebrushes do grow together sometimes, and they overlap somewhat in their habitats, but they simply are not both shrubs of fine-textured soils or soils with impervious clay layers. What's true for *A. arbuscula* is untrue for *A. nova*.

**Vegetation Description**
Low-stature sagebrush shrubs, sometimes with conspicuous (though sparse) grass layer taller than the shrubs (especially with ARAR8). The two vegetation series (*Artemisia nova* and *Artemisia arbuscula*) are here combined; though they occupy different climates (ARAR8 on much colder sites), they have very similar physiognomies and responses to fire; almost never do the two species occur together or in adjacent sites. Total live cover usually <100%, averaging 60-80%.

*Artemisia tripartita* (threetip) ssp. *rupicola* is also an indicator species for 1072. It certainly is a dwarf shrub, usually shorter even than *Artemisia nova* and *Artemisia arbuscula*. *A. tripartita* ssp. *rupicola* is probably a dominant, or co-dominant, shrub over more acres than is *Artemisia nova*. *A. tripartita* ssp. *rupicola* is more restricted geographically, though, limited to central and southeastern Wyoming -- subsections M331Ad, M331Aj (and maybe M331Ai), 342Aa; section 342F; and subsection 342Gb. (It may extend slightly into subsections 342Ga and 342Gd as well but doubtful.) These three dwarf shrubs sometimes grow together, but vegetation with only *A. tripartita* ssp. *rupicola* is quite common.

The two subspecies of *A. tripartita* are quite different and probably do not grow together.

*A. tripartita rupicola* can grow on fine-textured soils, but in parts of central Wyoming and all of southeastern Wyoming, it grows on coarse-textured soils derived from granite or resistant sedimentary rocks (limestones and sandstones). In fact, the shrub might be more common on coarse-textured soils than fine-textured soils. (See biophysical site description for further explanation of differences in soils.)

Threetip sagebrush is an historic indicator on sites with higher precipitation and shallow soil within MZ22. Black sagebrush as well. Low sagebrush is rare in our area of MZ22 but may be more common elsewhere. In comparison, low sagebrush is very common in other areas, with black sagebrush being rare and threetip sagebrush nonexistent. Overall, black sagebrush is more common than threetip sagebrush throughout our area.

**BpS Dominant and Indicator Species**

| Symbol | Scientific Name | Common Name |
|---|---|---|
| ARNO4 | *Artemisia nova* | Black sagebrush |
| ARAR8 | *Artemisia arbuscula* | Little sagebrush |
| ARPE6 | *Artemisia pedatifida* | Birdfoot sagebrush |
| ARTR4 | *Artemisia tripartita* | Threetip sagebrush |
| KOMA | *Koeleria macrantha* | Prairie junegrass |
| PSSP6 | *Pseudoroegneria spicata* | Bluebunch wheatgrass |
| POSE | *Poa secunda* | Sandberg bluegrass |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

**Disturbance Description**

Fire has very little effect on this ecosystem, since there is little vegetation to carry a fire. Low and black sagebrush are easily killed by fire, but stands usually don't burn, apparently because of low productivity, low canopy heights, and fuel too scattered. In MZ28, the majority of reviewers agreed with a 125yr average; one review suggested using a 400yr average. A slightly higher (less fire) fire return interval was chosen for MZ22.

Native ungulates sometimes cause erosion in these stands when they trail across them, especially in spring and fall when the sites are wet. The sites are resilient and resistant to trampling in summer and winter, when they are dry or frozen. This was not modeled here.

Fall 2005 burning of low sagebrush patches and stands in a matrix of mountain big sagebrush stands at Fossil Butte National Monument near Kemmerer, WY, resulted in their removal. Fall

2006 sampling of sites for vegetation map accuracy assessment resulted in no observations of low sagebrush seedlings on burned sites. These patches and stands were mature to becoming decadent with high cover values for the type, up to 35-40% cover for some occurrences. Plot data were recorded to support classification of this vegetation type among others for production of a vegetation map (vonLoh, personal communication).

**Fire Frequency**

| Severity | Avg FI | Percent of All Fires | Min FI | Max FI |
|---|---|---|---|---|
| Replacement | 327 | 100 | | 400 |
| Moderate (Mixed) | | | | |
| Low (Surface) | | | | |
| All Fires | 327 | 100 | | |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

**Scale Description**

The scale of polygons varies with the scale of the habitat, from small patches in the 10s of acres, up to larger sites of 100s-1,000s of acres.

**Adjacency or Identification Concerns**

Often occurs interspersed or alternating with big sagebrush shrublands, sometimes in a mosaic, corresponding to the mosaic of habitats (moderately well drained vs. excessively poorly drained).

It is guessed that the succession classes of low sagebrush are about the same now as they used to be; the shrubs are neither denser nor taller than before so that there shouldn't be too much departure. However, this is only a guess based on expert opinion.

This system might be departed as a function of grazing, at least around Pryor Mountains. Midgrasses such as bluebunch and needle/thread, have been replaced by shorter grass such as Sandberg, junegrass, blue grama, and maybe squirreltail.

**Issues or Problems**

Little information exists about historical disturbances in this system. Patch sizes were probably <500ac and interspersed in other vegetation communities.

**Native Uncharacteristic Conditions**

Over 40% shrub cover would be uncharacteristic. Also shouldn't be taller than 0.5m.

**Comments**

MZs 22 and 29 were combined during 2015 Biophysical Setting Review.

## *Succession Classes*

**Mapping Rules**

| Upper Layer Lifeform | Height (m) | Canopy Cover (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0-10 | 11-20 | 21-30 | 31-40 | 41 - 50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | B | B | B | B | B | B | B | B | B | B |
| Tree | 0-5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | >50 | B | B | B | B | B | UN | UN | UN | UN | UN |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

## Description

**Class A** **32** **Early Development 1 - All Structures**

*Indicator Species*

| Symbol | Scientific Name | Common Name | Canopy Position |
|---|---|---|---|
| POSE4 | Polygonum segetum | Field smartweed | Upper |
| KOMA | Koeleria macrantha | Prairie junegrass | Upper |
| ELEL5 | Elymus elymoides | Squirreltail | Upper |
| PSSP6 | Pseudoroegneria spicata | Bluebunch wheatgrass | Upper |

*Description*

Grass- and forb-dominated site. Black/low sagebrush seedlings are young and begin to establish toward the end of this seral period.

Replacement fire occurs.

For MZ29, at least, STCO (HECOC8) -- common dominants in Mueggler's (1980) description of PNV dominants in absence of improper grazing. ELEL5 is probably more of an indicator of disturbance/improper grazing.

*Maximum Tree Size Class*

None

**Class B** **68** **Late Development 1 - Open**

*Indicator Species*

| Symbol | Scientific Name | Common Name | Canopy Position |
|---|---|---|---|
| ARNO4 | Artemisia nova | Black sagebrush | Upper |
| ARAR8 | Artemisia arbuscula | Little sagebrush | Upper |

| | | | |
|---|---|---|---|
| ELEL5 | Elymus elymoides | Squirreltail | Middle |
| KOMA | Koeleria macrantha | Prairie junegrass | Middle |

*Description*
Black/low sagebrush with mid-height late seral grasses.

Replacement fire occurs.

For MZ29, at least, PSSP6, STCO (HECOC8), POSE -- common dominants in Mueggler's description of PNV dominants in absence of improper grazing. ELEL5 is probably more of an indicator of disturbance/improper grazing.

*Maximum Tree Size Class*
None

## Model Parameters

### Deterministic Transitions

| From Class | Begins at (yr) | Succeeds to | After (years) |
|---|---|---|---|
| Early1:ALL | 0 | Late1:OPN | 125 |
| Late1:OPN | 126 | Late1:OPN | 999 |

### Probabilistic Transitions

| Disturbance Type | Disturbance occurs In | Moves vegetation to | Disturbance Probability | Return Interval (yrs) | Reset Age to New Class Start Age After Disturbance? | Years Since Last Disturbance |
|---|---|---|---|---|---|---|
| Replacement Fire | Early1:ALL | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |

## References


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