

J. SUBALPINE SAGEBRUSH SHRUBLANDS (SU)

30. Mountain Big Sagebrush Series

Table 30-1. Full names and short names for the ecological types in the Mountain Big Sagebrush Ecological Series.

Ecological Type Code	Name	Plant Association Code	Short Name
SU1	Mountain big sagebrush/Thurber fescue-Arizona fescue-Deep Argic Cryoborolls-Moderate slopes, 8,500-10,300 ft	ARTRV/FETH-FEAR2	Mountain sagebrush/Thurber-Arizona fescues-Deep cold clay soils
SU2	Mountain big sagebrush/Thurber fescue-Idaho fescue-Deep Argic Cryoborolls-Slopes and mesas, 8,800-10,400 ft	ARTRV/FETH-FEID	Mountain sagebrush/Thurber-Idaho fescues-Deep loamy clay soils
SU3	Mountain big sagebrush/Idaho fescue-Deep, sandy Cryic soils-Glacial outwash terraces and moraines, 9,400-10,000 ft	ARTRV/FEID	Mountain sagebrush/Idaho fescue-Sandy soils-Glacial

This is the *Artemisia tridentata* ssp. *vaseyana* (mountain big sagebrush) Series of Bunting and others (1987), and it is included in the *Artemisia tridentata* Series of Hess (1981), Hess and Wasser (1982), Moir (1983), and Komárková (1986). Moir (1983) considers it to be a climatic series. The *Artemisia* (Sagebrush) Series of Donart and others (1978) and Tweit and Houston (1980) is much too large. This Series occurs on sites that are better drained and better aerated than those that support low sagebrush (Fosberg and Hironaka 1964, Robertson and others 1966). Stands of this series occupy medium-sized to large, isodiametric sites, which are easily distinguished on aerial photographs.

Vegetation, Climate, Soils

Forage production can be high to very high on sites in good condition. Management should work to protect reproduction of Idaho, Arizona, and

Thurber fescues. Hanson and others (1983) reported herbage production of 1,420 kg/ha/yr (730-1,970 kg/ha/yr) in southwestern Idaho. They derived an equation for their area relating yield index (J , %) to November-April precipitation (p_1 , mm) and May-June precipitation (p_2 , mm). The yield index is the crop year (September-June) production for the year of interest, divided by the mean yearly crop production.

$$J = 0.55(p_1 + p_2) - 10.6$$

Table 30-2. Production in mountain big sagebrush/ Idaho fescue type in northern Nevada (Jensen and others 1988)

Plant Group	Value \pm SD ¹ , kg/ha/yr
Shrubs	258 \pm 231
Graminoids	343 \pm 156
Forbs	183 \pm 192
Total	784 \pm 329

1. Standard deviation.

Table 30-3. Climate and Soils

Characteristic	Value	Reference
Precipitation	810 mm/yr (510-1,050 mm/yr) 32 in/yr (20-42 in/yr)	Plummer and others (1968), Hanson and others (1983), Sturges (1989)
Growing period	50 da (32-70 da)	
Soil degree-days	157 (110-230)	Jensen (1989)
Soil temperature	Annual: 6°C (4-9°C) 43°F (39-48°F) Summer: 12°C (8-16°C) 54°F (46-61°F)	

Range Management

Heavy grazing and road and trail use can significantly compact soils in these sites.

Snow fencing in a mountain big sagebrush site eliminated sagebrush downwind of the fence up to 3 times the height of the fence, probably because the soil remained saturated for longer than normal. Canopy cover of sagebrush decreased as much as 18 times the height of the fence upwind of the fence, probably because of a snow mold (likely an Ascomycete; Sturges 1989).

Many stands of mountain big sagebrush in the Great Basin were sprayed with 2,4-D in the 25 years following World War II. Chemical spraying with 2,4-D increases grass cover and litter and decreases bare ground five years after spraying (Sturges 1986). Sagebrush density slowly recovers but is still less than pre-fire density even 20 yr after (Sturges 1993).

Burning is recommended to control big sagebrush, but burned areas must be in large enough aggregates, and sites must be protected from wildlife and livestock for long enough after (at least two growing seasons; Wright and others 1979), to assure recovery of vegetation cover. Otherwise, bare ground that follows overgrazing induces invasion by undesirables such as Douglas rabbitbrush.

Spraying with 2,4-D reduces soil water depletion in the upper 1.8 m of soil in stands of sagebrush (Sturges 1993). Where sagebrush was mechanically removed (grubbed), soil water depletion was reduced in the surface 1.2 m of soil, primarily below 0.6 m (Sturges 1980).

Fire Management

The frequency of stand-replacing fire in presettlement times ranged from 40 to 60 years, with smaller fires every 20 to 25 years (Wright and others 1979). Repeated burning every few years or burning in summer depletes stands of perennial grasses and allows weeds, invasive forbs, and cheatgrass to increase (Wright and others 1979).

Prescribed fires should be planned for early spring or after late summer, and caution should be exercised where bitterbrush is dominant (Wright and others 1979).

After a fire, the vegetation is dominated by perennial forbs for 2 to 3 years, after which grasses dominate until sagebrush re-establishes. Spring fires do not eliminate any species, but increase productivity of some species (Bunting and others 1987).

The seeds of mountain big sagebrush germinate better following fire, and new plants grow rapidly

and may reach maturity in 3 to 5 years. Mountain big sagebrush may return to preburn density and cover within 15 to 20 years, but recovery may take 30 years or more following a severe fire (Bunting and others 1987). Rabbitbrush and horsebrush may resprout after fire.

Insects and diseases are not documented for this series.

Wildlife Management

These sites provide habitat for a variety of ground-nesting and ground-feeding birds. Areas between sagebrush shrubs are favored by elk, and especially by deer, for bedding, since there is often abundant forage and much hiding cover below 1 m.

In other areas outside the UBG, this Series can occur within critical winter range for mule deer and elk, but it does not occur in the winter ranges for those animals in the UBG (see for example Terwilliger and Tiedeman 1978, Dealy and others 1981, Tiedeman and others 1987, Wambolt 1995). Where mountain big sagebrush is a conspicuous dominant in elk and deer winter ranges, the animals prefer it over other species of sagebrush, and it comprises more than half the winter diets of mule deer (Wambolt 1995). Deer on their winter range can cause mortality of big sagebrush or partial dieback of sagebrush canopy through their browsing (McArthur and others 1988).

Revegetation and Rehabilitation

Invasion by Kentucky bluegrass (*Poa pratensis*) is common after disturbance. Restoration of native plants can be difficult after depletion of the community by grazing (Hironaka and others 1983). Soils of this series are deep and highly productive of a large variety of grasses, forbs, and shrubs, so species should be easy to establish, but sites are sometimes prone to slumping. Management should work to establish soil-binding vegetation cover as quickly as possible after disturbance.

Recreation, Roads & Trails, Scenery

Sites of this series are only moderately suitable for roads and trails, since the soils are deep and loamy, and sites are sometimes slumpy. Roads and trails should be graveled, cut banks riprapped, and ditches and culverts allowed for. Road and trail use may lead to significant soil compaction. Sites of this series are not recommended for developed recommendation, for which they are only moderately suitable, but some places are completely unsuitable where disturbance increases the downward mobility of slumps. Sites of this series are moderately suitable for dispersed recreational activities. Heavy grazing and road and trail use can significantly compact soils.

Key to Ecological Types in the Mountain Big Sagebrush Series

1. Silver sagebrush >15% cover, usually dominant. Soils from alluvium or "Slope alluvium," >8,900 ft..... (2)
1. Silver sagebrush absent or <15% cover, if it is present then it is dominated by other shrubs(3)
2. Geyer willow present, T-25% cover. Shrubby cinquefoil >5% cover. Quackgrass or Baltic rush >10% cover
Lower elevations, 7,800-9,700 ft. Soils from geologically recent alluvium RI3
2. Geyer willow absent. Shrubby cinquefoil absent or <1% cover. Quackgrass and Baltic rush absent or <5%
cover. Higher elevations, 8,900-10,400 ft. Soils from Pleistocene alluviumSU7
3. Geyer willow present, T-25% cover. Shrubby cinquefoil >5% cover. Quackgrass or Baltic rush >10% cover.
Lower elevations, 7,800-9,700 ft..... RI3
3. Geyer willow absent.....(4)
4. Low sagebrush >15% cover(5)
4. Low sagebrush absent or <15% cover (8)
5. Shrubby cinquefoil prominent, >10% cover..... RI6
5. Shrubby cinquefoil usually absent(6)
6. Parry oatgrass usually present, 0-75% cover. Less coarse (average 19%) soils, Cryoboralfs.....SU5
6. Parry oatgrass absent to <2% cover. Coarser (average 42%) soils, Cryoborolls.....(7)
7. Deeper (average 85 cm), coarser (average 32%), loamier soils, Argic Cryoborolls..... SU1
7. Somewhat shallower (average 73 cm), less coarse (average 19%), clayier soils, Smectitic Cryoboralfs
.....SU5
8. Thurber fescue usually absent, sometimes <0.05% cover. Idaho fescue always present, >2%. Parry oatgrass
usually absent. Shallower soils (average 62 cm deep), from glacial sources.....SU3
8. Either Thurber fescue >0.5% cover, or Parry oatgrass >10% cover. Idaho fescue is sometimes present,
sometimes absent. Deeper soils (average 85 cm), rarely from glacial sources..... SU2

Table 30-4. Characteristics of Ecological Types within Ecological Series 30 in Upper Gunnison Basin.
Numbers are Average (Minimum-Maximum)

Code Short Name	No. Samples	Elevation, ft	Avg. Aspect, °M (r) Slope, %	Soil Coarse, %	Depth, cm Mollic, cm	Surface: Coarse, % Bare, %	Cover, %: Trees Shrubs Graminoids Forbs	Total Live Cover, % No. Species TLC/NS, %
SU1. Mountain sagebrush/Thurber- Arizona fescues—Deep cold clay soils	45	9,422 (8,560-10,220)	168 (0.19) 17 (0-45)	42 (15-78)	73 (33-137) 36 (17-62)	5 (0-67) 8 (0-45)	0 (0-8) 50 (10-135) 97 (50-170) 46 (3-110)	193.5 (120.9-340.0) 26 (10-46) 9.1 (3.1-26.2)
SU2. Mountain sagebrush/Thurber- Idaho fescues—Deep loamy clay soils	15	9,585 (8,820-10,400)	328 (0.28) 12 (4-26)	32 (7-59)	85 (63-98) 26 (15-46)	4 (0-67) 10 (1-30)	0 (0-0) 28 (6-65) 95 (14-225) 51 (16-105)	174.4 (78.8-311.0) 25 (12-46) 9.4 (3.1-25.9)
SU3. Mountain sagebrush/Idaho fescue—Sandy soils— Glacial	14	9,666 (9,440-9,940)	283 (0.09) 7 (1-26)	43 (21-72)	62 (50-79) 7 (0-25)	14 (1-42) 11 (3-25)	0 (0-0) 24 (14-39) 71 (38-103) 36 (13-67)	131.5 (90.0-157.3) 31 (25-36) 4.3 (3.5-5.6)

MOUNTAIN SAGEBRUSH/THURBER-ARIZONA FESCUES—DEEP COLD CLAY SOILS

Mountain big sagebrush/Thurber fescue-Arizona fescue—
Deep Argic Cryoborolls—Moderate slopes, 8,500-10,300 ft

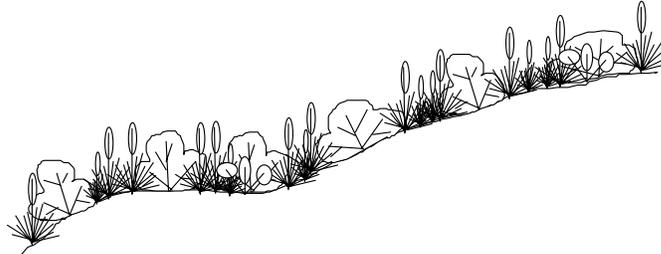


Figure 30-1. Cross-section of vegetation structure of *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils*. Aspects are non-northerly, and slope angles average 17%.

Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils is a very common type on cold Subalpine slopes, in areas with deep clay soils, usually outside rainshadows. This type occurs on Subalpine benches and slumps in the northern part of the Gunnison Basin. It has been noted in southwestern Colorado, northern New Mexico, and northern Arizona, and probably occurs in southeastern Utah as well. *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils* is characterized by mountain big sagebrush (ARTRV), Thurber fescue (FETH), and Arizona fescue (FEAR2). Many sites have Parry oatgrass (DAPA2) as well. See Table 30-8 for common species names and codes. Other distinguishing features include the lack of Idaho fescue (FEID) and deep, cold (Cryic) soils with thick dark (Mollic) layer.

Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils is related to *Thurber-Arizona fescues—Deep cold dark soils*, a grassland type which occurs at higher elevations, and lacks sagebrush. *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils* is also related to *Douglas-fir/Thurber fescue—Cold dark soils—Gentle*, a forested type dominated by Douglas-fir (PSME), which occurs on coarser soils and northerly slopes. *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils* is also related to *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils*, which occurs at slightly higher elevations on deeper, less-coarse soils, and in which Idaho fescue (FEID) replaces Arizona fescue.

Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils is also related to *Mountain sagebrush/Idaho fescue—Sandy soils—Glacial*, which occurs on sandy soils on glacial surfaces and lacks Thurber fescue. *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils* is also related to *Aspen/Thurber fescue—Deep dark soils*, a forested type dominated by

aspen which occurs on gentler slopes with shallower, less-coarse soils.

The plant association *Artemisia tridentata* ssp. *vaseyana/Festuca thurberi-Festuca arizonica*, described as new here, is based in part on descriptions in Komárková (1986) and Langenheim (1962).

Thurber fescue is an obligate outcrosser; which means that plants must be close enough together for pollen to move from one plant to another in order to set seed. When Thurber fescue plants are 3-4 m or more apart, pollen cannot transfer between plants, and the stand becomes non-reproductive. When existing plants senesce and die, Thurber fescue is lost from the site, increasing erosion potential and creating a permanent disclimax. Once heavy grazing or other disturbance removes grass reproduction (particularly fescue species), Kentucky bluegrass, dandelion, weeds, and forbs increase and eventually dominate under mountain big sagebrush. There is probably a semi-permanent *Disclimax* stage of mountain big sagebrush and Kentucky bluegrass dominance, since the fescues are slow to return once the seed source has been eliminated.

An indicator of good condition in this type is the presence of enough young Thurber fescue plants to eventually replace the old plants. Spruce-fir forest borders this type toward the uplands, and willow riparian or water sedge riparian communities adjoin this type toward the bottoms. Aspen forests occur on adjacent steeper, more protected slopes and slumps. Patches of Thurber fescue grassland, aspen, or low sagebrush may occur within these sites.

Horizontal obstruction varies from low to moderate, averaging moderately low. Elk and deer use these sites for forage and bed grounds in the summertime though there is less than optimum cover in these stands. Sites accumulate too much snow to be of use even in mild winters. Mule deer and elk use of all community types is low in the

winter, but high for forage and overnight stays

spring through fall.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	45, soil descriptions from 16 (total 45)
ELEVATION	9,422 ft (8,560-10,220 ft); 2,872 m (2,600-3,120 m)
ASPECT	Various, usually not northerly
LITHOLOGY	Primarily clay-producing sedimentaries and soft igneous: Shale [28%], sandstone [15%], Soft Tuff [15%], Breccia and Basalt [15%], Mudstone [9%]. Some harder rocks: Granite [11%], Gneiss and Schist [7%]
FORMATIONS ¹	A wide variety of formations.
LANDFORMS	Mostly soil creep slopes [81%], some mesas and ridges [13%]
SLOPE POSITIONS	Mostly backslopes [50%], footslopes and lower backslopes [22%]; the rest upper backslopes to summits
SLOPE SHAPES	Mostly linear [72%] horizontally, Mostly linear [72%] vertically
SLOPE ANGLE	17% (0-45%)
SOIL PARENT MATERIAL	Mostly colluvium [77%], some residuum [10%]
COARSE FRAGMENTS	4% (0-14%) on surface, mostly the surface has no coarse fragments. Coarse fragments are 42% (15-78%) by volume in soil
SOIL DEPTH	71 cm (33-137 cm); 28 in (13-54 in)
MOLLIC THICKNESS	35 cm (17-62 cm); 14 in (6.5-25 in)
TEXTURE	<i>surface</i> : Mostly loamy (loam-silt loam-clay loam [83%]); <i>subsurface</i> : Mostly clay-loamy (clay loam-clay-silty clay loam-sandy clay loam [82%])
SOIL CLASSIFICATION	Predominantly Argic Cryoborolls [94%]
TOTAL LIVE COVER	193.5% (120-340%)
NUMBER OF SPECIES	26 (10-46)
TOTAL LIVE COVER/NO. SPECIES	9.1% (3.1-26.2%)
CLIMATE	Usually outside deep rainshadow. Subalpine climate, cool to cold, moist, exposed to sun, slightly exposed to wind
WATER	No permanent water on sites, but sites are often adjacent to willow riparian areas. Soils may be seasonally wet, and often have a few redoximorphic mottles.

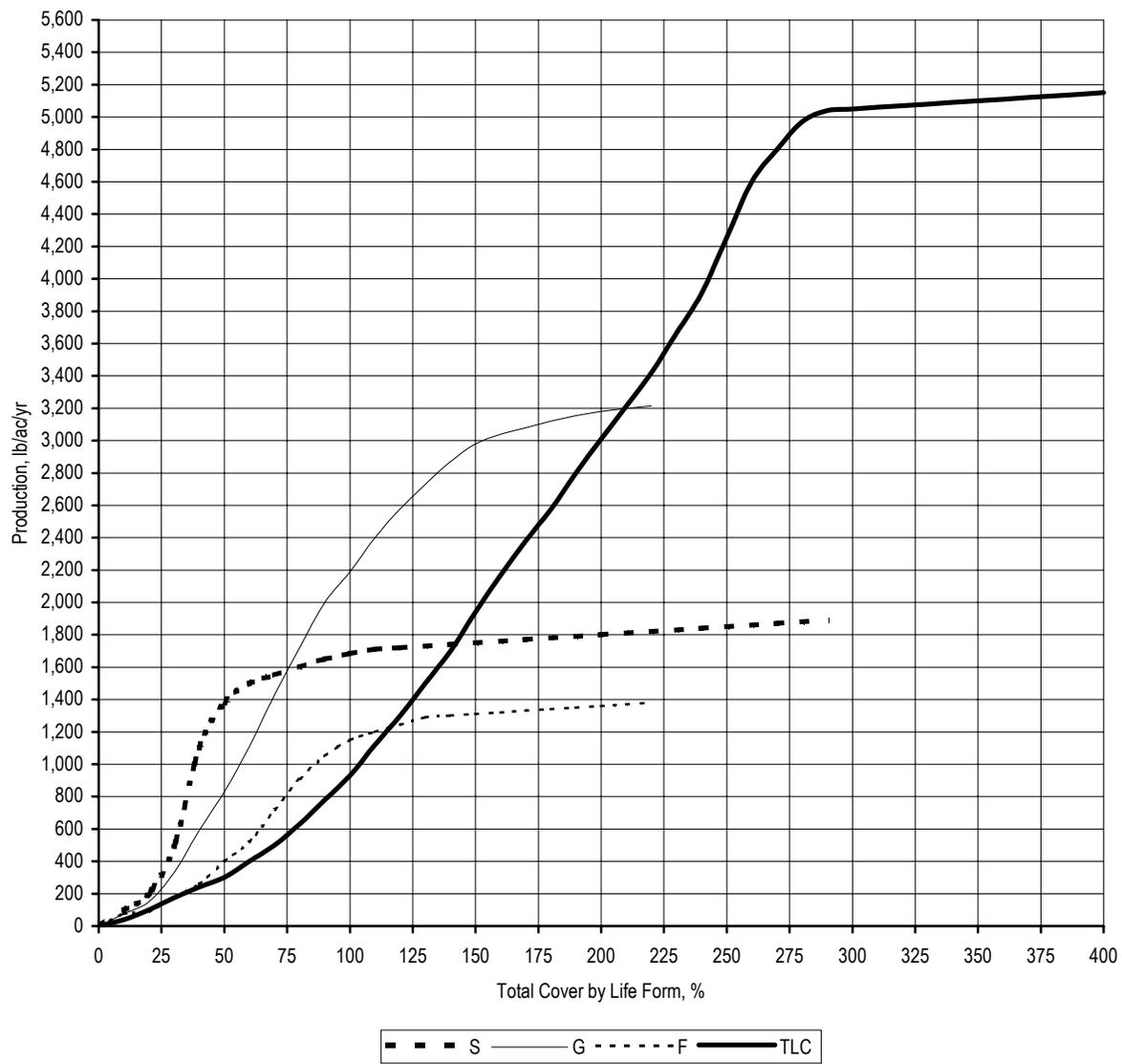


Figure 30-2. Relationship of cover by growth form and production. This is the ARTRFETH (ARTRV-FETH) model. S = shrubs, G = graminoids, F = forbs, and TLC = Total live cover.

Key to Community Types

- | | |
|--|---|
| 1. Bitterbrush (PUTR2) present, 0.5-45% cover, often >5% (2) | 6. Thurber fescue >35% cover C |
| 1. Bitterbrush absent (3) | 6. Thurber fescue <35% cover D |
| 2. Total graminoid cover >90%. Bitterbrush <30% cover, subordinate to mountain sagebrush B | 7. Parry oatgrass present, T-40% cover(8) |
| 2. Total graminoid cover <90%. Bitterbrush 25-50% cover, codominant with mountain sagebrush F | 7. Parry oatgrass absent(9) |
| 3. Total graminoid cover >90%..... (4) | 8. Bitterbrush >15% cover, codominant with sagebrush F |
| 4. Total graminoid cover <90%..... (7) | 8. Bitterbrush usually absent E |
| 4. Parry oatgrass present, T-95% cover..... (5) | 9. Bitterbrush >15% cover, codominant with sagebrush F |
| 4. Parry oatgrass absent (6) | 9. Bitterbrush usually absent.....(10) |
| 5. Bitterbrush present, 0.5-30% cover B | 10. Total graminoid cover 70-90% G |
| 5. Bitterbrush absent A | 10. Total graminoid cover <70%..... H |
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Description of Community Types

- A** *Mountain sagebrush-Parry oatgrass* Mountain sagebrush is dominant with 12-45% cover. There is no bitterbrush. Parry oatgrass dominates the understory, usually >20% cover. Thurber fescue is usually present, ranging from 0 to 65% cover. Total graminoid cover ranges from 96 to 160%. Graminoid production is 2,000-3,000 lb/ac/yr.
- B** *Mountain sagebrush-bitterbrush-Thurber fescue* Mountain sagebrush is dominant, with 30-50% cover. Bitterbrush is always present, ranging from 0.5 to 30% cover. Parry oatgrass is sometimes present, with up to 40% cover. Thurber fescue is always present but sometimes sparse, ranging from 0.5 to 25% cover. Total graminoid cover ranges from 100 to 170%. Graminoid production is 2,200-3,200 lb/ac/yr.
- C** *Mountain sagebrush-Thurber fescue* Mountain sagebrush is dominant, with 10-45% cover. Bitterbrush and Parry oatgrass are absent. Thurber fescue is codominant, with 40-90% cover. Total graminoid cover ranges from 90 to 160%. Graminoid production is 1,700-3,000 lb/ac/yr.
- D** *Mountain sagebrush-sparse Thurber fescue* Mountain sagebrush is dominant, with 10-65% cover. Bitterbrush and Parry oatgrass are absent. Thurber fescue is present in small amounts, 5-25% cover. Total graminoid cover ranges from 90 to 180%. Graminoid production is 1,800-3,200 lb/ac/yr.
- E** *Mountain sagebrush-Parry oatgrass-Thurber fescue* Mountain sagebrush is dominant, with 25-45% cover. Bitterbrush is absent. Parry oatgrass is present, T-35% cover. Thurber fescue is present, T-25% cover. Total graminoid cover ranges from 70 to 90% Graminoid production is 1,400-2,000 lb/ac/yr.
- F** *Mountain sagebrush-bitterbrush* is dominated by bitterbrush, with 15-45% cover, and mountain sagebrush, with 15-55% cover. Bitterbrush is absent. Parry oatgrass is usually absent, but may be present up to 2% cover. Thurber fescue is usually absent, but may have as much as 10% cover. Elk sedge (CAGE2) or Kentucky bluegrass (POPR) are prominent, usually at least one of these is >20% cover. Total graminoid cover ranges from 60 to 100%. Graminoid production is 750-2,200 lb/ac/yr.
- G** *Mountain sagebrush-rabbitbrush-forbs* Mountain sagebrush is dominant, with 20-40% cover. Bitterbrush and Parry oatgrass are absent. Thurber fescue is absent or present up to 35% cover. Total graminoid cover ranges from 60 to 75%. Graminoid production is 1,200-2,000 lb/ac/yr.
- H** *Mountain sagebrush-sparse Thurber fescue-forbs* is dominated by mountain sagebrush, with 10-45% cover, and Douglas rabbitbrush (CHV18), with 0-35% cover. Bitterbrush and Parry oatgrass are absent. Thurber fescue is present, sometimes in smaller amounts, T-30% cover. Total graminoid cover is <50%, and graminoid production is 750-1,400 lb/ac/yr.
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Table 30-5. Wildlife values (relative to the whole UGB) for the principal wildlife species using Mountain sagebrush/Thurber-Arizona fescues-Deep cold clay soils. "*" means the same as above.		
CT	Mule Deer	Elk
	Season-Preference	Season-Preference
All	Winter, Any- Low Spring/Fall- High (Forage, Overnight)	Winter, Any- Low Spring/Fall- High (Forage, Overnight)

Table 30-6. Community types within Mountain sagebrush/Thurber-Arizona fescues-Deep cold clay soils.										
Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Layer Height, m	Avg Layer Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.', lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Mountain sagebrush-Parry oatgrass	6	9,638 (9,140-10,220) 11.0 (4-21)	46 (15-78) 50 (46-53) 26 (17-34)	1 (1-48) 7 (0-32) PN	GF 0.4 (0.0-1.2) S1 0.5 (0.3-0.9) S2 0.3 (0.0-0.6) M 0.00 L 0.00	91.0 21.4 14.7 0.6 0.3	0 (0-2) 43 (20-80) 124 (98-150) 49 (15-110)	22 (12-35) 216 (149-282) 11.3 (6.0-18.8)	484-1582 2149-2959 51-1174	0 (0-0) 3 (0-5) 25 (0-50) 73 (45-100) 25 (11-39)
B. Mountain sagebrush-bitterbrush-Thurber fescue	4	9,350 (9,120-9,480) 19.7 (14-25)	* * *	* 5 (0-32) LS	*		2 (0-7) 60 (47-70) 129 (106-162) 41 (25-51)	15 (13-19) 231 (201-257) 15.3 (13.4-16.3)	1121-1478 2313-3047 114-458	*
C. Mountain sagebrush-Thurber fescue	7	9,461 (8,560-9,800) 12.7 (0-28)	41 (23-59) 103 (60-137) 35 (18-49)	2 (0-6) 1 (1-3) LM	GF 0.6 (0.0-2.1) S1 0.7 (0.3-1.0) S2 0.3 (0.0-0.9) M 0.00 L Missing	97.6 19.3 10.9 0.3 M	0 (0-0) 33 (10-47) 117 (91-150) 55 (20-85)	27 (13-34) 205 (121-266) 8.2 (4.5-16.2)	257-1119 1977-2963 69-929	0 (0-0) 3 (0-10) 35 (0-75) 83 (65-100) 30 (18-46)
D. Mountain sagebrush-sparse Thurber fescue	8	9,427 (9,020-9,960) 20.3 (9-45)	30 (20-45) 75 (62-89) 53 (45-62)	6 (0-14) 12 (2-25) MS	GF 0.5 (0.0-1.2) S1 0.6 (0.3-1.0) S2 0.4 (0.0-0.6) M Missing L Missing	86.4 32.9 6.9 M M	0 (0-2) 59 (12-135) 118 (92-170) 45 (17-75)	24 (13-36) 222 (159-340) 11.2 (4.8-26.2)	284-1790 2012-3096 59-803	0 (0-0) 0 (0-0) 25 (15-35) 93 (85-100) 29 (25-34)
E. Mountain sagebrush-Parry oatgrass-Thurber fescue	3	9,437 (9,120-9,870) 14.0 (4-32)	67 58 22	8 (3-13) 16 (8-23) LM	GF 0.2 (0.0-0.7) S1 0.7 (0.5-0.9) S2 0.2 (0.0-0.5) M Missing L Missing	76 25 19 M M	0 (0-0) 40 (34-45) 77 (75-81) 30 (19-35)	24 (10-31) 147 (128-157) 8.3 (4.3-15.6)	840-1083 1573-1731 65-233	0 0 5 70 19
F. Mountain sagebrush-bitterbrush	7	9,298 (8,960-9,640) 24.0 (6-30)	41 (21-61) 70 (38-108) 35 (17-51)	10 (1-17) 4 (0-11) MS	GF 0.2 (0.0-0.7) S1 0.5 (0.3-0.8) S2 0.1 (0.0-0.2) M Missing L Missing	70 58 24 M M	1 (0-8) 71 (52-106) 71 (52-95) 28 (3-90)	27 (14-45) 171 (141-237) 8.1 (3.1-16.9)	1214-1740 899-2082 9-987	0 (0-0) 0 (0-0) 15 (0-25) 68 (40-85) 21 (10-28)
G. Mountain sagebrush-rabbitbrush-forbs	3	9,577 (9,400-9,720) 14.7 (7-21)	38 (35-40) 70 (62-78) 37 (28-45)	3 (3-4) 10 (5-17) EM	GF 0.5 (0.0-0.9) S1 0.6 (0.3-1.0) S2 0.4 (0.0-0.6) M Missing L Missing	82.5 31.5 15.1 M M	0 (0-0) 38 (32-42) 74 (65-85) 57 (26-82)	39 (36-43) 169 (151-187) 4.4 (3.9-5.2)	798-1026 1297-1842 126-896	0 0 0 45 11
H. Mountain sagebrush-sparse Thurber fescue-forbs	7	9,259 (8,840-9,810) 15.6 (7-22)	45 (20-70) 38 (33-46) 33 (24-41)	4 (0-13) 9 (0-21) EM-ES	GF 0.2 (0.0-0.5) S1 0.5 (0.3-0.7) S2 0.2 (0.0-0.3) M 0.00 L Missing	89.6 19.3 30.3 T M	0 (0-0) 46 (26-61) 57 (50-65) 59 (14-110)	32 (17-46) 162 (129-227) 5.4 (4.0-7.6)	648-1358 843-1278 50-1172	0 (0-0) 0 (0-0) 15 (5-25) 78 (70-85) 23 (23-24)

*. Unknown: measurements were not taken in this CT.

Table 30-7. Resource Values for Mountain sagebrush/Thurber-Arizona fescues-Deep cold clay soils. Resource values were calculated from the numbers in Table 30-6, relative to the whole UGB.								
The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.								
C o m m u n i t y T y p e								
Resource Value	A	B	C	D	E	F	G	H
Potential Cattle Forage Production	5	5	4-5	5	4	3-4	4	3-4
Grazing Suitability	5	5	4	5	4	3	4	3
Wetland	No							
Riparian Area	No							
Developed Recreation	1	1	1	0-1	1	1	1	1
Dispersed Recreation	2	2	2	1-2	2	2	2	2
Scenic	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Road & Trail Stability	2	2	2	1-2	2	2	2	2
Construction Suitability	1	1	1	0-1	1	1	1	1
Deer & Elk Hiding Cover	1-2	1-2	2-3	2	1	1-2	0-1	1
Deer & Elk Forage & Browse	3-4	3-4	3-4	3	3	3	3	3
Sage Grouse Cover	4-6	4-5	5-6	6	5-6	4-6	3	5-6
Sage Grouse Nesting/Brood Potential	1 ¹							
Need for Watershed Protection	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Soil Stability	3	3	3	3	3	3	3	3
Risk of Soil Loss-Natural	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Risk of Soil Loss-Management	4	4	4	4	4	4	4	4
Risk of Permanent Depletion-Range	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Risk of Permanent Depletion-Wildlife	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3
Resource Cost of Management	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Cost of Rehabilitation	4	4	4	4	4	4	4	4

1. Elevation too high, site under snow during season.



A typical mountain sagebrush - Thurber fescue site (Community Type C). Thurber fescue 81%, mountain big sagebrush 36%, Lewis flax 23%, elk sedge 16%, aspen peavine 10%, vetch 5%, Arizona fescue <1%. Coarse Fragments Cover = 1%, Bare Soil Cover = 1%, Total Live Cover = 209%, Coarse Fragments in Soil = 35. West Elk Peak SW Quadrangle, elevation 9,330 ft, flat slope. June 23, 1994.

Table 30-8. Common Species in *Mountain sagebrush/Thurber-Arizona fescues-Deep cold clay soils*, where Characteristic cover > 10% or Constasy > 20%. "-" means that the species is not found. Dead cover is not listed. Cv = Characteristic Cover, Cn = Constasy. If Avc = Average Cover, then these are related using the formula $Avc = Cv \cdot 100\% / Cn$.

Community Type		A	B	C	D	E	F	G	H	Common Name
Code	Species	Cv(Cn) N = 6	Cv(Cn) 4	Cv(Cn) 7	Cv(Cn) 8	Cv(Cn) 3	Cv(Cn) 7	Cv(Cn) 3	Cv(Cn) 7	
SHRUBS										
ARAR8	<i>Artemisia arbuscula</i>	-	-	-	20 (13)	-	-	13 (33)	11 (14)	low sagebrush
ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	31(100)	41(100)	24(100)	36(100)	35(100)	34(100)	31(100)	28(100)	mountain big sagebrush
CEFE	<i>Ceanothus fendleri</i>	-	-	-	20 (13)	-	6 (29)	-	-	buckbrush
CHNA2	<i>Chrysothamnus nauseosus</i>	-	-	6 (71)	15 (25)	-	-	1 (67)	1 (29)	rubber rabbitbrush
CHV18	<i>Chrysothamnus viscidiflorus</i>	13 (33)	9(100)	1 (29)	10 (75)	6 (67)	4 (71)	1(100)	13 (71)	Douglas rabbitbrush
PUTR2	<i>Purshia tridentata</i>	-	9(100)	-	-	-	29(100)	-	-	antelope bitterbrush
ROWO	<i>Rosa woodsii</i>	12 (17)	-	2 (29)	-	-	1 (14)	1 (33)	2 (71)	Woods rose
SYRO	<i>Symphoricarpos rotundifolius</i>	13 (33)	1 (25)	4 (86)	8 (75)	T (33)	2 (71)	T (67)	4 (86)	mountain snowberry
GRAMINOIDS										
ACLE9	<i>Achnatherum lettermanii</i>	-	-	4 (43)	3 (38)	4 (33)	4 (14)	1 (33)	5 (43)	Letterman needlegrass
ACNE9	<i>Achnatherum nelsonii</i>	5 (17)	10 (50)	3 (14)	6 (50)	1 (33)	2 (14)	T (33)	-	Nelson's needlegrass
ACPI2	<i>Achnatherum pinetorum</i>	14 (17)	10 (25)	13 (29)	7 (25)	-	6 (57)	-	-	pine needlegrass
BRCA10	<i>Bromopsis canadensis</i>	3 (17)	-	3 (43)	5 (38)	3 (67)	-	1 (67)	1 (57)	fringed brome
BRIN7	<i>Bromopsis inermis</i>	-	-	-	-	-	1 (14)	34 (33)	-	smooth brome
CAREX	<i>Carex</i>	-	-	-	52 (13)	-	-	-	21 (14)	sedge
CAGE2	<i>Carex geyeri</i>	39 (17)	65 (50)	25 (71)	36 (50)	24 (33)	13 (86)	18 (33)	4 (57)	elk sedge
CAOB4	<i>Carex obtusata</i>	6 (17)	-	-	38 (13)	20 (33)	1 (14)	30 (33)	14 (14)	blunt sedge
DAPA2	<i>Danthonia parryi</i>	44(100)	21 (50)	-	-	14(100)	1 (14)	-	-	Parry oatgrass
ELEL5	<i>Elymus elymoides</i>	10 (33)	5 (75)	T (14)	20 (75)	1 (67)	9 (71)	5(100)	3 (43)	bottlebrush squirreltail
ELTR7	<i>Elymus trachycaulus</i>	15 (17)	-	2 (57)	10 (13)	-	-	T (33)	1 (43)	slender wheatgrass
FEAR2	<i>Festuca arizonica</i>	1 (50)	-	8 (57)	7 (13)	9 (67)	9 (43)	3 (67)	11 (43)	Arizona fescue
FESA	<i>Festuca saximontana</i>	-	-	-	-	11 (33)	-	-	-	Rocky Mountain fescue
FETH	<i>Festuca thurberi</i>	26 (83)	10(100)	69(100)	11(100)	13(100)	9 (29)	17 (67)	12(100)	Thurber fescue
HECO26	<i>Hesperostipa comata</i>	50 (17)	20 (25)	1 (14)	18 (75)	40 (33)	14 (57)	11 (33)	-	needle-and-thread
KOMA	<i>Koeleria macrantha</i>	10 (67)	8 (50)	4 (86)	7 (63)	3 (33)	4 (57)	9 (67)	2 (29)	prairie junegrass
LECI4	<i>Leymus cinereus</i>	-	-	11 (14)	-	-	-	-	-	giant wildrye
NAVI4	<i>Nassella viridula</i>	-	-	-	12 (13)	-	-	-	-	green needlegrass
POA	<i>Poa</i>	-	80 (25)	9 (14)	40 (13)	-	-	1 (33)	-	bluegrass
POFE	<i>Poa fendleriana</i>	3 (17)	20 (50)	8 (57)	15 (38)	5 (67)	27 (86)	15 (67)	17 (29)	muttongrass
POPR	<i>Poa pratensis</i>	60 (33)	35 (75)	8 (29)	30 (63)	-	15 (14)	1 (33)	18 (86)	Kentucky bluegrass
FORBS										
ACLA5	<i>Achillea lanulosa</i>	9 (83)	20 (25)	7 (86)	11 (50)	6(100)	T (14)	4(100)	8(100)	western yarrow
ADLE	<i>Adenolinum lewisii</i>	4 (17)	-	23 (57)	-	-	-	-	3 (14)	blue flax
AGGL	<i>Agoseris glauca</i>	1 (17)	-	3 (57)	3 (38)	-	T (14)	3 (33)	1 (14)	false-dandelion
ANRO2	<i>Antennaria rosea</i>	1 (67)	-	T (29)	-	5 (67)	-	-	2 (29)	rose pussytoes
CAGU	<i>Calochortus gunnisonii</i>	2 (17)	-	T (14)	2 (38)	1 (33)	T (43)	-	-	Gunnison mariposa
CALI4	<i>Castilleja linariifolia</i>	-	15 (25)	2 (43)	4 (63)	-	4 (71)	1(100)	1 (14)	Wyoming paintbrush
ERCO24	<i>Eremogone congesta</i>	15 (17)	25 (25)	10 (14)	15 (38)	-	9 (86)	26 (67)	15 (29)	desert sandwort
EREA	<i>Erigeron eatonii</i>	2 (33)	-	-	3 (25)	-	1 (14)	T (67)	1 (43)	Eaton fleabane
ERSP4	<i>Erigeron speciosus</i>	13 (33)	15 (75)	10 (14)	9 (38)	-	3 (43)	-	-	Oregon fleabane
ERSU2	<i>Erigeron subtrinervis</i>	10 (33)	-	3 (14)	3 (38)	6 (67)	3 (29)	6 (67)	-	threeneve fleabane
ERRA3	<i>Eriogonum racemosum</i>	3 (33)	-	-	T (13)	1 (33)	2 (86)	2(100)	T (14)	redroot buckwheat
ERSU11	<i>Eriogonum subalpinum</i>	8 (50)	4 (75)	12 (29)	4 (25)	10 (33)	1 (29)	T (33)	5 (29)	sulfurflower
HEVI4	<i>Heterotheca villosa</i>	-	20 (25)	-	-	-	2 (14)	-	-	hairy golden aster
LALE2	<i>Lathyrus leucanthus</i>	7 (33)	-	18 (29)	13 (25)	-	-	3 (67)	5 (57)	aspen peavine
LITE2	<i>Ligusticum tenuifolium</i>	12 (17)	-	-	-	-	-	-	-	fern-leaf lovage
LUAR3	<i>Lupinus argenteus</i>	11 (33)	8 (50)	7 (43)	13 (63)	17 (33)	5 (29)	9 (33)	3 (57)	silvery lupine
PHMU3	<i>Phlox multiflora</i>	-	-	5 (29)	-	-	15 (29)	4 (33)	12 (43)	flowery phlox
PODO4	<i>Polygonum douglasii</i>	-	-	T (14)	1 (25)	-	T (14)	1 (67)	1 (43)	Douglas knotweed
POPU9	<i>Potentilla pulcherrima</i>	5 (33)	5 (25)	T (57)	1 (38)	-	3 (14)	2 (67)	3 (71)	beauty cinquefoil
TAOF	<i>Taraxacum officinale</i>	1 (50)	-	1 (57)	4 (50)	4 (67)	-	4(100)	3 (71)	common dandelion
THFE	<i>Thalictrum fendleri</i>	20 (17)	-	-	-	-	-	-	-	Fendler meadow-rue
VIAM	<i>Vicia americana</i>	5 (33)	-	3 (71)	6 (38)	-	-	7(100)	8 (57)	American vetch
GROUND COVER										
.BARESO	bare soil	7 (50)	5 (25)	1 (86)	12 (63)	16 (67)	4 (43)	10(100)	9 (86)	
.LITTER	litter and duff	95 (67)	-	95 (86)	82 (50)	77 (67)	85 (43)	77(100)	88(100)	
.GRAVEL	gravel 0.2-10 cm	1	-	1	4	4	4	2	3	
.COBBLE	cobble 10-25 cm	-	-	-	-	-	4 (29)	T (33)	1 (57)	
.STONES	stone > 25 cm	-	-	6 (14)	-	-	4 (29)	1 (33)	T (14)	
.MOSSON	moss on soil	1 (33)	-	1 (29)	-	1 (33)	T (14)	-	1 (43)	
.LICHENS	lichens on soil	1	-	-	-	-	T	T	-	

MOUNTAIN SAGEBRUSH/THURBER-IDAHO FESCUES—DEEP LOAMY CLAY SOILS

Mountain big sagebrush/Thurber fescue-Idaho fescue—
Deep Argic Cryoborolls—Slopes and mesas, 8,800-10,400 ft

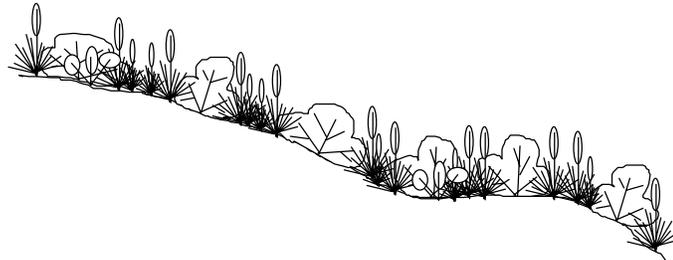


Figure 30-3. Cross-section of vegetation structure of *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils*. Aspects are various, and slope angles average 12%.

Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils is a very common type on cold Subalpine slopes in areas with deep clay soils, usually outside rainshadows. It is common on Subalpine slopes in the Gunnison Basin. This type also occurs throughout northwestern and central-western Colorado, perhaps also in eastern Utah, northern New Mexico, and northern Arizona. *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils* is characterized by mountain big sagebrush (ARTRV), Thurber fescue (FETH), and Idaho fescue (FEID). Many sites also have Parry oatgrass (DAPA2). See Table 30-11 for common species names and codes. Other distinguishing features include subalpine locations, and residual or colluvial Cryoborolls.

Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils is related to *Thurber-Idaho fescues—Deep cold dark soils*, a grassland type which occurs at higher elevations and lacks sagebrush. *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils* is also related to *Douglas-fir/Thurber fescue—Cold dark soils—Gentle*, a forested type dominated by Douglas-fir (PSME), which occurs on coarser soils and northerly slopes. *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils* is also related to *Mountain sagebrush/Thurber-Arizona fescues—Deep cold clay soils*, which occurs at slightly lower elevations on shallower, coarser soils. Arizona fescue (FEAR2) replaces Idaho fescue.

Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils is also related to *Mountain sagebrush/Idaho fescue—Sandy soils—Glacial*, which occurs on sandy soils on glacial surfaces and lacks Thurber fescue. *Mountain sagebrush/Thurber-Idaho fescues—Deep loamy clay soils* is also related to *Aspen/Thurber fescue—Deep dark soils*, a forested type dominated by aspen (POTR5), which occurs on gentler slopes with shallower, less-coarse soils.

The plant association *Artemisia tridentata* ssp. *vaseyana/Festuca thurberi-Festuca idahoensis*, described as new here, is based on *Artemisia tridentata* ssp. *vaseyana/Festuca thurberi* (Terwilliger 1978, Hess 1981-1982).

Thurber fescue is an obligate outcrosser; which means that plants must be close enough together for pollen to move from one plant to another in order to set seed. When Thurber fescue plants are 3-4 m or more apart, pollen cannot transfer between plants, and the stand becomes non-reproductive. When the plants senesce and die, Thurber Fescue is lost from the site, increasing erosion potential and creating a permanent disclimax. Once heavy grazing or other disturbance has removed grass reproduction (particularly fescue species), Kentucky bluegrass, dandelion, weeds, and forbs increase and eventually dominate under mountain big sagebrush. There is probably a semi-permanent *Disclimax* stage of mountain big sagebrush and Kentucky bluegrass dominance, since the fescues are slow to return once the seed source is eliminated.

An indicator of good condition in this type is the presence of enough young Thurber fescue plants to eventually replace the old plants. Spruce-fir forest borders this type on adjacent uplands. Willow riparian or water sedge riparian communities adjoin this type in bottoms. Aspen communities occur on steeper, more protected slopes and slumps. Patches of Thurber fescue grassland, aspen, or low sagebrush may occur within these sites. Horizontal obstruction varies from low to moderate, averaging moderately low. Elk and deer use these sites for forage and bed grounds in the summertime, though cover is sparse. Sites accumulate too much snow to be of use by big game even during mild winters. Use of all community types by mule deer and elk is low during any winter, but high during spring through fall for forage and overnight stays.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	15, soil descriptions from 6 (total 15)
ELEVATION	9,585 ft (8,820-10,400 ft); 2,921 m (2,688-3,170 m)
AVERAGE ASPECT	328°M (r = 0.28)
LITHOLOGY	Sandstone-mudstone-shale [55%], Tuff-granite [30%], Conglomerate [15%]
FORMATIONS ¹	A wide variety
LANDFORMS	Soil creep slopes [58%], mesas and benches [33%]
SLOPE POSITIONS	Footslopes, lower backslopes, toeslopes [77%]
SLOPE SHAPES	Mostly linear both horizontally and vertically
SLOPE ANGLE	12.3% (4-26%)
SOIL PARENT MATERIAL	Colluvium [64%] or residuum [27%]
COARSE FRAGMENTS	3.2% (0-11%) cover on surface, 31.5% (7-59%) by volume in soil
SOIL DEPTH	85 cm (63-98 cm); 33.6 in (25-39 in)
MOLLIC THICKNESS	26 cm (15-46 cm); 10.1 in (6-18 in)
TEXTURE	surface: Loam [63%], silty clay loam, sandy loam; subsurface: Clay, sandy clay loam, or clay loam
SOIL CLASSIFICATION	All Cryoborolls, mostly Argic [75%]
TOTAL LIVE COVER	174.4% (78.8-311.0%)
NUMBER OF SPECIES	25.4 (12-46)
TOTAL LIVE COVER/NO. SPECIES	9.4% (3.1-25.9%)
CLIMATE	Usually outside deep rainshadow. Subalpine climate, cool to cold, moist, exposed to sun, slightly exposed to wind
WATER	No permanent water on sites, but sites are often adjacent to willow riparian areas. Soils may be seasonally wet, and often have a few redoximorphic mottles.

Key to Community Types

1. Thurber fescue >30% cover **A**
 1. Thurber fescue <30% cover (2)
2. Parry oatgrass >10% cover, often >30% (3)
 2. Parry oatgrass absent or rarely <5% cover (4)
3. Thurber fescue present, >5% cover. Idaho fescue >5% cover, often >10% **B**
 3. Thurber fescue absent or <5% cover. Idaho fescue <10% cover **C**
4. Total graminoid cover >60% **D**
 4. Total graminoid cover <60% **E**

Description of Community Types

- A** *Parry oatgrass-Thurber fescue-mountain sagebrush-Idaho fescue* is dominated by Parry oatgrass, 40-80% cover. Mountain sagebrush cover is 10-20%, and is being outcompeted by oatgrass. Thurber fescue cover is 30-50%. Total graminoid cover ranges from 100 to 150%. Graminoid production is 2,300-3,000 lb/ac/yr.
- B** *Parry oatgrass-Idaho fescue-mountain sagebrush* is dominated by a mix of Parry oatgrass, with 10-80% cover, Idaho fescue, with 5-45% cover, mountain sagebrush, with 1-40% cover, and Thurber fescue, with 5-30% cover. Kentucky bluegrass (POPR) or slender wheatgrass (ELTR7) may be prominent in some sites. Total graminoid cover ranges from 80 to 230%. Graminoid production is 1,500-3,400 lb/ac/yr.
- C** *Parry oatgrass-mountain sagebrush-muttongrass-sparse Idaho fescue* is dominated by Parry oatgrass, with 40-60% cover. Mountain sagebrush, with 10-30% cover, is being outcompeted by oatgrass. Thurber fescue is absent or very minor. Total graminoid cover ranges from 80 to 95%. Graminoid production is 1,600-2,000 lb/ac/yr.
- D** *Mountain sagebrush-yarrow-sparse Thurber fescue-sparse Idaho fescue* is dominated by mountain sagebrush, with 15-45% cover. Parry oatgrass is absent. Idaho fescue and Thurber fescue cover each range from 1-15%. Total graminoid cover ranges from 60 to 100%. Graminoid production is 1,200-2,200 lb/ac/yr.
- E** *Mountain sagebrush-sparse Thurber fescue-sparse Idaho fescue* is dominated by mountain sagebrush, with 10-55% cover. Parry oatgrass is absent. Idaho fescue is always present, T-10% cover. Thurber fescue is always present at 2-15% cover. Total graminoid cover ranges from 10 to 40%. Graminoid production is 150-600 lb/ac/yr.

Table 30-9. Community types within <i>Mountain sagebrush/Thurber-Idaho fescues-Deep loamy clay soils</i> .											
Community Type	ns	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Serai Stage	Layer Height, m			Cover, %: Trees Shrubs Gramin. Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod. ¹ , lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
					Lr	Avg Layer Cvr %					
A. Parry oatgrass-Thurber fescue-mountain sagebrush-Idaho fescue	3	9,760 (9,450-9,920) 11.7 (6-20)	23 (7-38) 94 (89-98) 24 (21-27)	* 3 (1-5) PN-LS	S1 0.7 (0.4-1.1) GF 0.3 (0.0-1.3) S2 0.3 (0.0-0.8) M 0.0 L 0.0	7.1 96.4 10.1 0.6 1.3	0 (0-0) 21 (15-31) 120 (106-142) 54 (25-105)	24 (13-34) 195 (153-246) 10.3 (4.5-18.9)	360-766 2331-2885 116-1132	0 0 5 65 18	
B. Parry oatgrass-Idaho fescue-mountain sagebrush	4	9,455 (9,080-9,910) 10.5 (6-21)	36 (14-59) 81 (63-98) 34 (27-40)	2 (1-3) 6 (5-6) LS	S1 0.6 (0.2-1.1) GF 0.4 (0.0-1.2) S2 0.3 (0.0-0.6) M 0.0 L 0.0	22.1 89.2 4.2 0.8 0.3	0 (0-0) 21 (6-41) 139 (82-225) 53 (35-80)	20 (12-36) 214 (143-311) 14.0 (4.0-25.9)	148-999 1768-3219 231-868	0 0 15 80 24	
C. Parry oatgrass-mountain sagebrush-muttongrass-sparse Idaho fescue	2	9,440 (9,440-9,440) 13.5 (13-14)	34 (27-41) 83 (83-83) 15 (15-15)	9 (7-11) 6 (6-7) LM-MS	S1 0.4 (0.2-1.1) GF 0.2 (0.0-0.8) S2 0.2 (0.0-0.4) M Missing L 0.0	27.6 83.3 4.6 M 0.6	0 (0-0) 27 (26-27) 86 (82-91) 34 (32-36)	31 (30-31) 147 (144-150) 4.8 (4.8-4.8)	644-672 1752-1981 189-250	0 (0-0) 0 (0-0) 3 (0-5) 65 (60-70) 17 (15-19)	
D. Mountain sagebrush-yarrow-sparse Thurber fescue-sparse Idaho fescue	3	9,310 (8,820-9,670) 12.0 (4-16)	26 98 46	2 (2-2) 14 (14-14) MS-EM	S1 0.5 (0.3-0.8) GF 0.3 (0.0-1.2) S2 Missing M 0.0 L 0.0	33 79 M 2 13	0 (0-0) 42 (20-65) 87 (69-96) 64 (53-73)	24 (13-45) 192 (142-234) 11.8 (3.2-16.7)	489-1414 1408-2094 490-777	0 0 0 20 5	
E. Mountain sagebrush-sparse Thurber fescue-sparse Idaho fescue	3	9,957 (9,690-10,400) 14.7 (4-26)	41 70 15	2 (1-4) 24 (21-30) MS	S1 0.6 (0.4-0.8) GF 0.2 (0.0-0.6) S2 0.3 (0.0-0.4) M 0.0 L 0.0	3 84 7 3 1	0 (0-0) 32 (11-50) 27 (14-38) 43 (16-91)	32 (23-46) 101 (79-140) 3.3 (3.1-3.4)	281-1178 163-530 56-997	0 0 0 30 8	

*. Unknown: measurements were not taken in this CT.

Table 30-10. Resource Values for <i>Mountain sagebrush/Thurber-Idaho fescues-Deep loamy clay soils</i> . Resource values were calculated from the numbers in Table 30-9, relative to the whole UGB.					
The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.					
Community Type					
Resource Value	A	B	C	D	E
Potential Cattle Forage Production	5	4-5	4	4	1-2
Grazing Suitability	5	4	4	4	2
Wetland	No	No	No	No	No
Riparian Area	No	No	No	No	No
Developed Recreation	1	1	1	0-1	1
Dispersed Recreation	2	2	2	1-2	2
Scenic	3-4	3-4	3-4	3-4	3-4
Road & Trail Stability	2	2	2	1-2	2
Construction Suitability	1	1	1	0-1	1
Deer & Elk Hiding Cover	1	1-2	1	0	0
Deer & Elk Forage & Browse	3-4	3-4	3-4	3	3
Sage Grouse Cover	5	6	5-6	1	2
Sage Grouse Nesting/Brood Potential	1 ¹				
Need for Watershed Protection	3-4	3-4	3-4	3-4	3-4
Soil Stability	3	3	3	3	3
Risk of Soil Loss-Natural	1-2	1-2	1-2	1-2	1-2
Risk of Soil Loss-Management	4	4	4	4	4
Risk of Permanent Depletion-Range	3-4	3-4	3-4	3-4	3-4
Risk of Permanent Depletion-Wildlife	2-3	2-3	2-3	2-3	2-3
Resource Cost of Management	3-4	3-4	3-4	3-4	3-4
Cost of Rehabilitation	4	4	4	4	4

1. Elevation too high, site under snow during season.



An example of mountain big sagebrush/Thurber fescue-Idaho fescue (Community Type A). Parry oatgrass 78%, Thurber fescue 45%, mountain big sagebrush 18%, Idaho fescue 16%, blunt sedge 4%. Coarse Fragments Cover = 0%, Bare Soil Cover = 1%, Total Live Cover = 186%, Coarse Fragments in Soil = 7. Soil sampled as an Abruptic Cryoboroll, Fine, Montmorillonitic. Powderhorn Quadrangle, elevation 9,910 ft, 6% 005° (N) slope. August 11, 1993.

Table 30-11. Common Species in *Mountain sagebrush/Thurber-Idaho fescues-Deep loamy clay soils*, where Characteristic cover > 10% or Constancy > 20%. "-" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula $Avc = Ccv \cdot 100\% / Con$.

Community Type		A	B	C	D	E	Common Name
Code	Species	Ccv (Con) N = 3	Ccv (Con) 4	Ccv (Con) 2	Ccv (Con) 3	Ccv (Con) 3	
SHRUBS							
ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	15 (100)	23 (75)	22 (100)	26 (100)	31 (100)	mountain big sagebrush
CHV18	<i>Chrysothamnus viscidiflorus</i>	15 (33)	3 (50)	4 (100)	10 (33)	1 (33)	Douglas rabbitbrush
SYRO	<i>Symphoricarpos rotundifolius</i>	-	3 (50)	1 (50)	13 (67)	-	mountain snowberry
GRAMINOIDS							
ACNE9	<i>Achnatherum nelsonii</i>	-	-	3 (100)	5 (33)	-	Nelson's needlegrass
BRCA10	<i>Bromopsis canadensis</i>	-	13 (25)	-	2 (67)	-	fringed brome
BRPO5	<i>Bromopsis porteri</i>	-	-	-	-	14 (33)	nodding brome
CAOB4	<i>Carex obtusata</i>	4 (33)	23 (25)	-	-	9 (33)	blunt sedge
CASTE3	<i>Carex stenophylla</i> ssp. <i>eleocharis</i>	-	-	-	11 (33)	-	needleleaf sedge
DAPA2	<i>Danthonia parryi</i>	59 (100)	34 (100)	52 (100)	-	-	Parry oatgrass
ELEL5	<i>Elymus elymoides</i>	1 (33)	1 (25)	2 (100)	-	2 (33)	bottlebrush squirreltail
ELTR7	<i>Elymus trachycaulus</i>	-	45 (50)	-	-	2 (33)	slender wheatgrass
FEID	<i>Festuca idahoensis</i>	16 (100)	23 (100)	6 (100)	6 (100)	3 (100)	Idaho fescue
FETH	<i>Festuca thurberi</i>	39 (100)	16 (100)	-	6 (100)	8 (100)	Thurber fescue
HECO26	<i>Hesperostipa comata</i>	5 (33)	5 (25)	1 (50)	-	-	needle-and-thread
KOMA	<i>Koeleria macrantha</i>	4 (67)	1 (25)	2 (100)	4 (33)	7 (33)	prairie junegrass
POFE	<i>Poa fendleriana</i>	-	4 (25)	21 (100)	21 (33)	1 (33)	muttongrass
POPR	<i>Poa pratensis</i>	-	62 (50)	-	80 (67)	-	Kentucky bluegrass
FORBS							
ACLA5	<i>Achillea lanulosa</i>	5 (67)	12 (75)	1 (100)	21 (100)	12 (33)	western yarrow
ADLE	<i>Adenolinum lewisii</i>	1 (33)	-	-	1 (33)	T (33)	blue flax
AMLA6	<i>Amerosedum lanceolatum</i>	-	-	4 (100)	4 (33)	1 (67)	yellow stonecrop
ANSE4	<i>Androsace septentrionalis</i>	-	-	-	1 (33)	T (100)	northern rock-jasmine
ANRO2	<i>Antennaria rosea</i>	2 (33)	6 (25)	2 (100)	17 (33)	3 (67)	rose pussytoes
CAGU	<i>Calochortus gunnisonii</i>	T (33)	-	-	3 (67)	-	Gunnison mariposa
CAL14	<i>Castilleja linariifolia</i>	-	5 (25)	2 (100)	T (33)	-	Wyoming paintbrush
ERCO24	<i>Eremogone congesta</i>	17 (100)	11 (100)	10 (100)	-	19 (33)	desert sandwort
ERIGE2	<i>Erigeron</i>	1 (33)	1 (25)	-	-	5 (33)	feabane
ERSP4	<i>Erigeron speciosus</i>	20 (33)	5 (25)	-	5 (33)	-	Oregon fleabane
ERSU2	<i>Erigeron subtrinervis</i>	T (33)	3 (50)	1 (50)	3 (33)	2 (33)	threenerve fleabane
ERSU11	<i>Eriogonum subalpinum</i>	20 (33)	1 (25)	-	-	9 (33)	sulfurflower
ERUM	<i>Eriogonum umbellatum</i>	2 (33)	-	-	3 (67)	-	sulfur buckwheat
ERTR19	<i>Erythrocoma triflora</i>	1 (33)	4 (50)	-	-	2 (67)	prairie smoke
GADR3	<i>Gastrolychnis drummondii</i>	T (33)	-	1 (50)	1 (33)	1 (33)	alpine campion
HEV14	<i>Heterotheca villosa</i>	-	-	-	-	12 (67)	hairy golden aster
HEPA11	<i>Heuchera parvifolia</i>	-	-	T (50)	T (33)	T (33)	littleleaf alumroot
LALE2	<i>Lathyrus leucanthus</i>	1 (33)	3 (25)	-	15 (33)	-	aspen peavine
LUAR3	<i>Lupinus argenteus</i>	9 (100)	30 (25)	-	-	T (33)	silvery lupine
ORLU2	<i>Orthocarpus luteus</i>	4 (67)	6 (75)	2 (100)	2 (33)	-	yellow owl-clover
PODO4	<i>Polygonum douglasii</i>	T (67)	-	-	1 (33)	-	Douglas knotweed
POHI6	<i>Potentilla hippiana</i>	2 (67)	-	-	2 (33)	1 (33)	horse cinquefoil
POPU9	<i>Potentilla pulcherrima</i>	1 (67)	4 (50)	-	-	1 (33)	beauty cinquefoil
PSMO	<i>Pseudocymopterus montanus</i>	2 (67)	-	-	1 (33)	-	mountain parsely
TAOF	<i>Taraxacum officinale</i>	1 (33)	15 (50)	T (50)	16 (67)	4 (100)	common dandelion
VIAM	<i>Vicia americana</i>	2 (67)	1 (25)	-	10 (33)	3 (33)	American vetch
GROUND COVER							
.BARESO	bare soil	3 (100)	6 (75)	6 (100)	14 (33)	24 (100)	
.LITTER	litter and duff	98 (67)	92 (50)	84 (100)	78 (33)	72 (100)	
GRAVEL	gravel 0.2-10 cm	-	1	4	1	1	
.COBBLE	cobble 10-25 cm	-	-	3 (50)	1 (33)	-	
.STONES	stone > 25 cm	-	-	-	-	-	
.MOSSON	moss on soil	1 (33)	1 (25)	-	2 (33)	3 (67)	
LICHENS	lichens on soil	3	1	1	13	2	

CT	Mule Deer	Elk
	Season-Preference	Season-Preference
All	Winter, Any- Low Spring/Fall- High (Forage, Overnight)	Winter, Any- Low Spring/Fall- High (Forage, Overnight)

Mountain big sagebrush/Idaho fescue–Deep, sandy Cryic soils–
Glacial outwash terraces and moraines, 9,400-10,000 ft

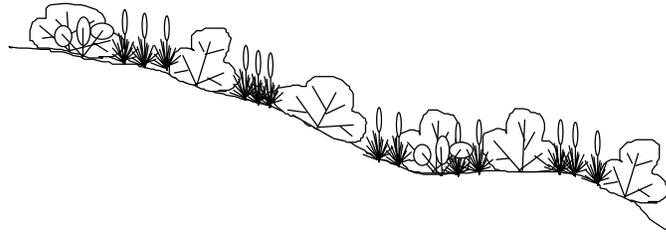


Figure 30-4. Cross-section of vegetation structure of *Mountain sagebrush/Idaho fescue–Sandy soils–Glacial*. Aspects are various, and slope angles average 7%.

Mountain sagebrush/Idaho fescue–Sandy soils–Glacial is a common type on glacial moraines and other glacial surfaces in areas with deep, sandy, cold soils. It occurs on slopes in the high Subalpine zone in the Gunnison Basin, and is especially common in and around Taylor Park. This type also occurs throughout the western slopes of the Rocky Mountains from Washington, Idaho, and western Montana, through western Wyoming, to northern and central Colorado and northeastern Utah.

Mountain sagebrush/Idaho fescue–Sandy soils–Glacial is characterized by mountain sagebrush (ARTRV), Idaho fescue (FEID), blunt sedge (CAOB4), and slimstem muhly (MUFI). See Table 30-15 for common species names and codes. Other distinguishing features include location in the Subalpine zone on glacial surfaces, Cryoborolls, and skeletal soils.

Mountain sagebrush/Idaho fescue–Sandy soils–Glacial is related to *Mountain sagebrush/Thurber-Idaho fescues–Deep loamy clay soils*, which occurs at somewhat lower elevations on deeper, less-coarse soils, not on glacial surfaces, and has prominent Thurber fescue (FETH).

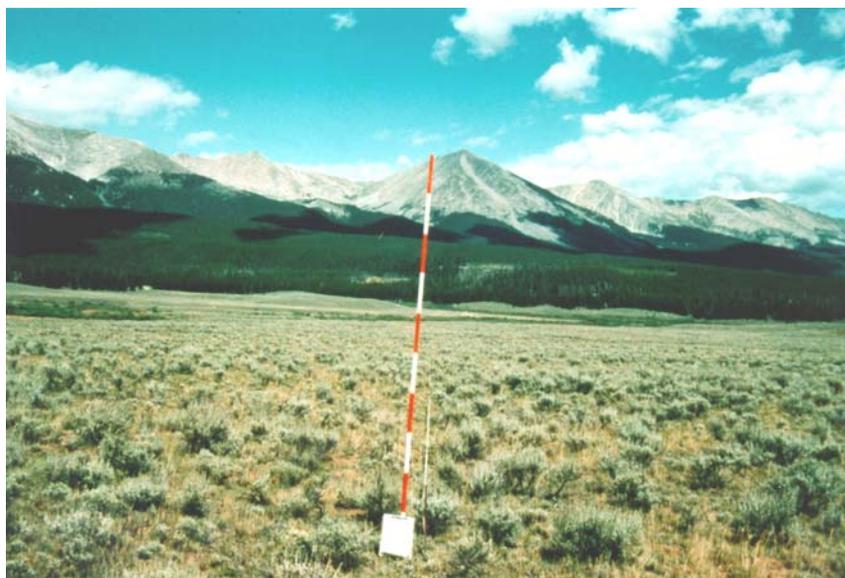
The plant association *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* has been documented by Daubenmire (1970), Lewis (1975), Houston (1976), Terwilliger and Smith (1978), Mueggler (1980), Tweit and Houston (1980), and Hess (1981-1982). This plant association as found here, only in the northeastern part of the Gunnison Basin, is Phase *Muhlenbergia filiculmis*, which is described as new here.

Grazing or other disturbance removes Idaho fescue and increases weedy forbs and bare ground. Spruce-fir forest adjoins this type on neighboring uplands. Willow riparian or water sedge riparian communities border this type in bottoms. Idaho fescue grassland frequently occurs adjacent to this type in these parks. Horizontal obstruction is low to very low. Deer and elk rarely come to these sites, as there is no cover and very little browse. The sites are too cold and high to be sage grouse habitat of any kind.

Summary of Ecological Type Characteristics

¹ Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	14, soil descriptions from 10; 2 not assigned to a CT (total 16)
ELEVATION	9,666 ft (9,440-9,940 ft); 2,946 m (2,877-3,030 m)
AVERAGE ASPECT	283°M (r = 0.09)
LITHOLOGY	Predominantly granite [94%]
FORMATIONS ¹	Predominantly Xg [94%]
LANDFORMS	Glacial outwash terraces [73%] and end moraines [27%]
SLOPE SHAPES	Linear [53%] to undulating [47%] horizontally, Mostly linear [67%] vertically
SLOPE ANGLE	7.3% (1-26%)
SOIL PARENT MATERIAL	Glacial
COARSE FRAGMENTS	13.9% (1-42%) cover on surface, 43.4% (21-72%) by volume in soil
SOIL DEPTH	62 cm (50-79 cm); 24.5 in (20-31 in)
MOLLIC THICKNESS	7 cm (0-25 cm); 2.9 in (0-10 in)
TEXTURE	A wide variety of surface textures; subsurface is usually sandy (loamy sand-sandy clay loam-sandy loam-sand [83%])
SOIL CLASSIFICATION	Cryoborolls [64%] or Cryochrepts [36%], all deep
TOTAL LIVE COVER	131.5% (90.0-157.3%)
NUMBER OF SPECIES	30.5 (25-36)
TOTAL LIVE COVER/NO. SPECIES	4.3% (3.5-5.6%)
CLIMATE	Cold to very cold partial rainshadow Subalpine climates. Sites are characterized by cold-air drainage year-round.
WATER	Soils are well-drained. Precipitation is low during the growing season, but significant moisture accompanies cold-air drainage daily. No open water in or near sites, but sites are sometimes adjacent to broad short-willow riparian areas.



A typical view of sagebrush in the bottom of Taylor Park, with mountain big sagebrush/Idaho fescue (Community Type B). Subalpine forest in the background, and above that the Alpine Zone. Idaho fescue 24% cover, slimstem muhly 21%, needleleaf sedge 21%, mountain big sagebrush 15%. Coarse Fragments Cover = 34%, Bare Soil Cover = 10%, Total Live Cover = 127%, Coarse Fragments in Soil = 29. Soil sampled as a Typic Cryoboroll, Loamy-Skeletal, Mixed. Pieplant Quadrangle, elevation 9,700 ft, 3% 044° (NW) slope. September 2, 1993.

Key to Community Types

- 1. Total graminoid cover >85%. Slimstem muhly >20% cover, often >25% **A**
- 1. Total graminoid cover <85%. Slimstem muhly <25% cover, often <20% (2)
- 2. Total graminoid cover 70-85% **B**
- 2. Total graminoid cover <70% (3)
- 3. Total graminoid cover 50-70% **C**
- 3. Total graminoid cover <50% **D**

Description of Community Types

- A** *Mountain sagebrush-Idaho fescue-slimstem muhly-prairie smoke* is dominated by mountain sagebrush, 15-35% cover, slimstem muhly, 20-40% cover, blunt sedge (CAOB4), 15-40% cover, and Idaho fescue, 15-40% cover. Total graminoid cover is 85-110%, and graminoid production is 1,750-2,400 lb/ac/yr.
- B** *Idaho fescue-mountain sagebrush-slimstem muhly* is dominated by mountain sagebrush, 10-25% cover, slimstem muhly, 5-25% cover, and Idaho fescue, 20-45% cover. Total graminoid cover is 70-85%, and graminoid production is 1,400-2,000 lb/ac/yr.
- C** *Mountain sagebrush-blunt sedge-Idaho fescue-slimstem muhly-horse cinquefoil* is dominated by a mix of mountain sagebrush, blunt sedge, Idaho fescue, and slimstem muhly. Total graminoid cover is 55-70%, and graminoid production is 800-1,400 lb/ac/yr.
- D** *Mountain sagebrush-Idaho fescue-desert sandwort* is dominated by mountain sagebrush and Idaho fescue. Total graminoid cover is <50%, and graminoid production is 400-900 lb/ac/yr.

Communities Not Assigned to a Community Type

- A community with small amounts of mountain sagebrush and Idaho fescue, but dominated by forbs such as sulfurflower (ERSU11), rose pussytoes (ANRO2), or prairie smoke (ERTR19). This is a community where the sagebrush was removed (mechanically or chemically), after which the site was grazed heavily.
- A community dominated by mountain sagebrush, prairie junegrass (KOMA), and blunt sedge (CAOB4). Slimstem muhly is present in small amounts, but Idaho fescue is absent. This is a heavily-grazed community.

Table 30-13. Community types within *Mountain sagebrush/Idaho fescue-Sandy soils-Glacial*.

Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Avg Layer Height, m			Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.', lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
					Lr	Layer Height, m	Cvr %				
A. Mountain sagebrush-Idaho fescue-slimstem muhly-prairie smoke	4	9,760 (9,700-9,820) 4.6 (1-12)	38 (21-59) 61 (50-64) 4 (0-12)	9 (1-22) 6 (3-11) LS-LM	S1	0.4 (0.2-0.6)	20.6	0 (0-0) 24 (20-35) 94 (87-103) 31 (24-43)	31 (25-36) 150 (139-157) 4.9 (4.4-5.6)	486-871 1877-2257 102-334	*
					GF	0.3 (0.0-0.8)	76.9				
					S2	0.2 (0.0-0.5)	8.9				
					M	0.0	9.4				
B. Idaho fescue-mountain sagebrush-slimstem muhly	3	9,630 (9,490-9,700) 5.5 (3-10)	44 (30-58) 55 (50-64) 5 (0-12)	16 (1-34) 9 (7-10) LM	S1	0.4 (0.2-0.6)	8.1	0 (0-0) 20 (14-25) 79 (74-84) 40 (38-42)	31 (28-33) 139 (127-147) 4.5 (4.4-4.5)	358-607 1551-1822 274-326	*
					GF	0.2 (0.0-0.6)	77.4				
					S2	0.1 (0.0-0.3)	12.7				
					M	0.0	2.1				
C. Mountain sagebrush-blunt sedge-Idaho fescue-slimstem muhly-horse cinquefoil	4	9,518 (9,440-9,700) 9.9 (2-13)	48 (22-72) 63 (52-79) 13 (0-25)	8 (2-20) 17 (10-25) LM	S1	0.3 (0.1-0.6)	21.8	0 (0-0) 24 (21-30) 61 (55-65) 31 (17-42)	32 (27-35) 121 (102-133) 3.7 (3.6-3.8)	528-749 999-1294 58-323	0 (0-0) 0 (0-0) 0 (0-0) 43 (30-55) 11 (8-14)
					GF	0.2 (0.0-0.6)	68.1				
					S2	0.1 (0.0-0.4)	13.3				
					M	0.0	3.8				
D. Mountain sagebrush-Idaho fescue-desert sandwort	3	9,773 (9,440-9,940) 9.3 (1-26)	44 (25-64) 70 (67-72) 8 (0-23)	27 (17-42) 13 (9-20) MS	S1	0.4 (0.3-0.8)	12.8	0 (0-0) 27 (14-39) 45 (38-50) 43 (13-67)	27 (26-28) 114 (90-127) 4.2 (3.5-4.5)	357-952 528-842 46-687	0 0 0 50 13
					GF	0.4 (0.0-0.9)	58.0				
					S2	0.3 (0.0-0.5)	16.6				
					M	0.0	12.0				
					L	0.0	7.7				

*. Unknown: measurements were not taken in this CT.

Table 30-14. Resource Values for *Mountain sagebrush/Idaho fescue–Sandy soils–Glacial*. Resource values were calculated from the numbers in Table 30-13, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

Community Type				
Resource Value	A	B	C	D
Potential Cattle Forage Production	4-5	4	4	3
Grazing Suitability	4	4	4	3
Wetland	No	No	No	No
Riparian Area	No	No	No	No
Developed Recreation	4	4	4	4
Dispersed Recreation	4-5	4-5	4-5	4-5
Scenic	4-5	4-5	4-5	4-5
Road & Trail Stability	4-5	4-5	4-5	4-5
Construction Suitability	4	4	4	4
Deer & Elk Hiding Cover	0-1	0-1	0-1	1
Deer & Elk Forage & Browse	2	2	2	1-2
Need for Watershed Protection	2	2	2	2
Soil Stability	4-5	4-5	4-5	4-5
Risk of Soil Loss-Natural	1-2	1-2	1-2	1-2
Risk of Soil Loss-Management	2-3	2-3	2-3	2-3
Risk of Permanent Depletion-Range	3	3	3	3
Risk of Permanent Depletion-Wildlife	1	1	1	1
Resource Cost of Management	3	3	3	3
Cost of Rehabilitation	3-4	3-4	3-4	3-4



Within a cattle-proof enclosure in upper Taylor Park, showing mountain big sagebrush/Idaho fescue (Community Type A), a common type in that park but rarely elsewhere. Here, there has been little grazing in recent decades, so the ground is nearly covered with grass bases and litter. Slimstem muhly 36% cover, Idaho fescue 33%, needleleaf sedge 24%, mountain big sagebrush 20%, diamond-leaf saxifrage 6%. Coarse Fragments Cover = 4%, Bare Soil Cover = 5%, Total Live Cover = 151%, Coarse Fragments in Soil = 21. Soil sampled as an Argic Cryoboroll, Sandy-Skeletal, Mixed. Italian Creek Quadrangle, elevation 9,820 ft, 3° 266° (W) slope. September 1, 1993.

Table 30-15. Common Species in *Mountain sagebrush/Idaho fescue–Sandy soils–Glacial*, where Characteristic cover > 10% or Constancy > 20%. "-" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avg = Average Cover, then these are related using the formula $Avg = Ccv \cdot 100\% / Con$.

Code	Community Type Species	A	B	C	D	Common Name
		Ccv (Con) N = 4	Ccv (Con) 3	Ccv (Con) 4	Ccv (Con) 3	
SHRUBS						
ARAR8	<i>Artemisia arbuscula</i>	2 (25)	3 (33)	6 (25)	T (33)	low sagebrush
ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	23 (100)	19 (100)	23 (100)	26 (100)	mountain big sagebrush
PESI	<i>Pediocactus simpsonii</i>	- -	- -	1 (50)	1 (33)	Simpson hedgehog cactus
GRAMINOIDS						
CAFO3	<i>Carex foenea</i>	1 (25)	1 (33)	1 (25)	- -	silvertop sedge
CAOB4	<i>Carex obtusata</i>	28 (100)	17 (100)	20 (100)	10 (100)	blunt sedge
FEID	<i>Festuca idahoensis</i>	28 (100)	32 (100)	14 (100)	18 (100)	Idaho fescue
KOMA	<i>Koeleria macrantha</i>	7 (100)	7 (100)	9 (100)	9 (100)	prairie junegrass
MUFI	<i>Muhlenbergia filiculmis</i>	29 (100)	16 (100)	14 (100)	6 (100)	slimstem muhly
POFE	<i>Poa fendleriana</i>	2 (100)	6 (100)	3 (100)	2 (67)	muttongrass
FORBS						
AMLA6	<i>Amerosedum lanceolatum</i>	T (50)	3 (67)	4 (100)	3 (100)	yellow stonecrop
ANSE4	<i>Androsace septentrionalis</i>	T (25)	- -	1 (25)	1 (33)	northern rock-jasmine
ANRO2	<i>Antennaria rosea</i>	2 (100)	4 (100)	4 (75)	2 (100)	rose pussytoes
ARFR4	<i>Artemisia frigida</i>	- -	1 (33)	2 (25)	T (33)	fringed sagewort
ERCO24	<i>Eremogone congesta</i>	2 (25)	6 (33)	6 (75)	14 (100)	desert sandwort
ERSU11	<i>Eriogonum subalpinum</i>	- -	1 (33)	- -	4 (67)	sulfurflower
ERTR19	<i>Erythrocoma triflora</i>	4 (100)	9 (67)	3 (50)	2 (67)	prairie smoke
GADR3	<i>Gastrolychnis drummondii</i>	- -	- -	T (50)	2 (33)	alpine campion
GEAC2	<i>Gentianella acuta</i>	1 (75)	2 (67)	1 (25)	- -	little gentian
HEVI4	<i>Heterotheca villosa</i>	T (25)	1 (33)	6 (50)	6 (67)	hairy golden aster
LIIN2	<i>Lithospermum incisum</i>	2 (75)	2 (67)	1 (50)	1 (33)	puccoon
LULEC3	<i>Lupinus lepidus</i> ssp. <i>caespitosus</i>	3 (100)	4 (67)	1 (100)	1 (67)	stemless lupine
MIRH	<i>Micranthes rhomboidea</i>	4 (75)	1 (67)	1 (25)	- -	diamond-leaf saxifrage
ORLU2	<i>Orthocarpus luteus</i>	3 (100)	3 (100)	2 (75)	2 (67)	yellow owl-clover
PECOP6	<i>Penstemon confertus</i> ssp. <i>procerus</i>	T (50)	T (33)	1 (50)	- -	yellow penstemon
PHMU3	<i>Phlox multiflora</i>	2 (50)	4 (67)	7 (50)	- -	flowery phlox
POFO	<i>Polemonium foliosissimum</i>	T (25)	T (67)	T (25)	- -	sky pilot
POCO13	<i>Potentilla concinna</i>	T (50)	- -	1 (25)	- -	elegant cinquefoil
POHI6	<i>Potentilla hippiana</i>	T (25)	T (67)	3 (100)	1 (100)	horse cinquefoil
PSMO	<i>Pseudocymopterus montanus</i>	1 (50)	3 (33)	- -	1 (67)	mountain parsely
PSJA2	<i>Pseudostellaria jamesiana</i>	8 (75)	3 (100)	1 (25)	5 (67)	tuber starwort
SOMU	<i>Solidago multiradiata</i>	1 (75)	5 (67)	6 (25)	10 (67)	mountain goldenrod
TAOF	<i>Taraxacum officinale</i>	3 (75)	3 (100)	T (75)	2 (33)	common dandelion
VISC	<i>Viola scopulorum</i>	T (25)	1 (33)	1 (25)	- -	violet
FERNS & FERN-ALLIES						
LYAN2	<i>Lycopodium annotinum</i>	- -	- -	18 (25)	- -	stiff clubmoss
GROUND COVER						
.BARESO	bare soil	6 (100)	9 (100)	17 (100)	13 (100)	
.LITTER	litter and duff	85 (100)	75 (100)	74 (100)	60 (100)	
GRAVEL	gravel 0.2-10 cm	4	10	4	16	
.COBBLE	cobble 10-25 cm	- -	- -	1 (25)	- -	
.STONES	stone > 25 cm	- -	- -	- -	- -	
.MOSSON	moss on soil	9 (100)	2 (100)	5 (75)	12 (100)	
LICHENS	lichens on soil	15	7	17	8	