3. Bristlecone Pine Ecological Series

Table 03-1. Full and short names for the ecological types in the Bristlecone Pine Ecological Series.

Ecological Type Code	Name	Plant Association Code	Short Name
FD04	Bristlecone pine/wax currant-Arizona fescue–Moderately deep to shallow colluvial Cryic soils–Southeasterly backslopes, 9,400-10,400 ft	PIAR/RICE-FEAR2	Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly
FD05	Bristlecone pine/Thurber fescue–Cryic soils–Subalpine slopes, > 11,000 ft	PIAR/FETH	Bristlecone pine/Thurber fescue–Cold soils

This is the *Pinus aristata* (bristlecone pine) Series of Donart and others (1978), Hess (1981-1986), Moir (1983-1993), Komárková (1986-1988), DeVelice and others (1986), Alexander (1988), Larson and Moir (1989), and Muldavin and others (1990). Moir (1983) considers it to be a non-climatic series.

Stands of this series are small- to medium-sized, often isodiametric to elliptic in shape and are easily distinguished on aerial photos.

Vegetation, Climate, Soils

Bristlecone pines often live in extremely dry environments and their growth is unusually sensitive to variations in temperature or precipitation. Narrow annual growth rings generally indicate unusually cold or dry years. Curtin's (1992) Colorado bristlecone pine chronology indicated such extremely cold or dry conditions in the years 1963, 1880, 1861, 1851, 1824, 1399, 1258, 989, and 553. Revegetation may be difficult in these cold sites because growth is slow.

Many stands are open and park-like, with small groups of trees interspersed with grasslands (Komárková and others 1988). The UGB lacks the characteristic gnarled, ancient, bristlecone pine timberline stands that are more common on the Eastern Slope in Colorado and in northern Arizona (Rominger and Paulik 1983, Brunstein and Yamaguchi 1993).

Timber Management

Tree productivity is low to very low and stands are sparse (Komárková and others 1988). Production management is not recommended for these stands. Some silvicultural practices could be considered if wildlife improvement or relief from insects and diseases is needed. Shelterwood cutting has sometimes been successful (Larson and Moir 1989). Insects and diseases are not documented for this series.

Fire

After a stand-replacing fire in an adjacent stand, cattle grazing can encourage bristlecone pine invasion into adjacent sites and the adjacent sites are maintained in a drier stage (Baker 1991). Otherwise, these stands are fairly fire-resistant.

Range and Wildlife Management

Forage production is typically sparse, although what little is produced is often of high quality and desirability. Sites are often rocky, steep, far from water, and difficult for livestock to access (DeVelice and others 1986, Komárková and others 1988). See *Festuca arizonica* and *Festuca thurberi* in the Species Section.

These sites are summer range for deer and elk, especially where palatable shrubs are present. Stands provide good to excellent views, but not much cover (Komárková and others 1988).

In the UGB, bristlecone pine stands are often an important component of bighorn sheep habitat. Sparse stands of the same bristlecone pine/fescue type found in the UGB are a medium-sized component of a low-elevation bighorn sheep winter range (but not the intermediate range or summer-lambing range) west of Saguache near the UGB. Within the winter range, Arizona fescue (FEAR2), fringed sage (ARFR4), sedges (CAREX), and mountain muhly (MUMO) are major components of the bighorn diet (Shepherd 1975). There are known stands of bristlecone pine/Arizona fescue stands in bighorn sheep summer range in the UGB.

Table 03-2. Climate and Soils

Characteristic	Values	References
Precipitation zone	525 mm/yr (410 - 640 mm/yr) 21 in/yr (16 – 25 in/yr)	Brunstein and Yamaguchi 1992

Recreation, Roads & Trails, Scenery

Stands are suitable for roads and trails since sites are stable and rocky, with little risk of mass movement. However, some sites are very exposed to wind, and excavation costs may be high because of the rocky soils. Many of these stands have high scenic value (Moir 1993).

Key to Ecological Types in the Bristlecone Pine Series

1. Thurber fescue (FETH) present and >15%. Wax currant (RICE) sometimes absent, or else <4%. Arizona fescue sometimes absent, or else <10%. Higher elevations, >10,500 ft FD05
1. Thurber fescue absent. Wax currant usually present, up to 20% cover. Arizona fescue always present, 3-20% cover. Lower elevations, <10,500 ft FD04

Table 03-3. Characteristics of Ecological Types within Ecological Series 3 in the Upper Gunnison Basin. Numbers are shown in form *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 Gramin. Forbs	Total Live Cover, % No. Species TLC/NS, %
FD04 Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly	8	9,985 (9,440-10,380)	143 (0.78) 26 (9-51)	54 (35-68)	71 (62-75) 9 (0-13)	43 (10-90) 14 (3-65)	49 (21-66) 7 (2-20) 37 (25-62) 14 (4-32)	107.2 (80.9-154.4) 26 (20-32) 4.2 (3.1-5.3)
FD05 Bristlecone pine/Thurber fescue–Cold soils	2	11,190 (10,520-11,860)	143 (0.78) 35 (21-48)	66	81 25	9 (2-16) 3 (1-6)	64 (55-73) 4 (4-5) 75 (24-126) 17 (6-29)	161.0 (112.9-209.1) 36 (28-43) 5.0 (2.6-7.5)

A bristlecone pine/wax currant-Arizona fescue stand above Cochetopa Park in very late season. This community type (C) has wax currant with Arizona fescue and mountain muhly prominent. Mountain muhly 24% cover, bristlecone pine 22%, wax currant 20%, Arizona fescue 13%. Coarse Fragments Cover = 53%, Total Live Cover = 89%, Coarse Fragments in Soil = 60. Soil sampled as a Typic Cryoboroll, Sandy-Skeletal over Fragmental, Mixed. Cochetopa Park Quadrangle, elevation 10,180 ft, 38% 179° (S) slope. October 29, 1994.

BRISTLECONE PINE/CURRANT-ARIZONA FESCUE–COLD SOILS–SOUTHEASTERLY

Bristlecone pine/wax currant-Arizona fescue–Moderately deep to shallow colluvial Cryic soils–Southeasterly backslopes, 9,400-10,400 ft

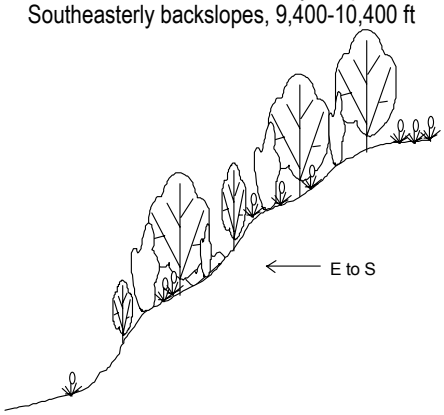

Figure 03-1. Cross-section of vegetation structure of *Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly*. Aspects are non-northerly, and slope angles average 12%.

Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly is an uncommon type on southeasterly backslopes (midslopes), in areas with cold soils usually within deep rainshadows. In the UGB, this type occurs on moderate to steep slopes in the Montane and lower Subalpine zones. It has also been described from southern Colorado and northern New Mexico (De Velice and others 1985-1986), always in deep rainshadows. Bristlecone pine (PIAR), wax currant (RICE), Arizona fescue (FEAR2), and mountain muhly (MUMO) characterize this type. Parry oatgrass (DAPA2) may be present in late-seral stands; see Table 03-7 for common species names and codes. Other distinguishing features include open stands, coarse Cryic soils, and locations in deep rainshadows. Ecotones are usually to one of the big sagebrush (ARTR2) types on gentler slopes, or to Douglas-fir (PSME) forests on more protected slopes.

The bristlecone pine canopy is sparse to moderately dense, ranging from 20 to 70% cover. Douglas-fir (PSME) is usually absent. Lodgepole pine (PICO) and spruces (PIPU, PIEN) are absent. Deer frequent these stands for cover and browse, so the wax currant layer varies from absent to moderately dense, 0-20% cover. In later-seral stages, stands support a sparse to moderate, medium to tall layer of wax currant, which is palatable to herbivores, notably deer. Thurber fescue (FETH), kinnikinnick (ARUV), buffaloberry (SHCA), and pachistima (PAMY) are all absent.

This type is closely related to *Douglas-fir/wax currant-Arizona fescue–Coarse thin-dark soils–Steep*, but this bristlecone pine type occurs on colder, shallower slopes in deep rainshadows near the Continental Divide in cold, dry microclimates. The Douglas-fir type occurs on somewhat warmer slopes with somewhat deeper soils outside the deep rainshadows, although it may be found in partial rainshadows. One of the plots included here seems to be transitional between the two, with bristlecone pine and Douglas-fir sharing dominance. This type is also related to *Ponderosa pine/Arizona fescue–Light-colored clay soils*, which occurs on much warmer, gentler slopes.

The plant association *Pinus aristata/Ribes cereum-Festuca arizonica* is a new name for *Pinus aristata/Festuca arizonica* of Shepherd (1975). It is renamed here because *Ribes cereum* is a more specific indicator and also a conspicuous species in these stands. *Pinus aristata/Ribes cereum-Festuca arizonica* phase *Danthonia parryi* is new as described here.

The length of the sere in this type is probably around 1,000 years, so succession (especially in the trees) is very difficult to see. Changes in the grasses and shrubs are somewhat faster, but recovery from disturbance is very slow. No vegetation management is recommended, except for revegetation, which is rarely required.

Moderately heavy to heavy grazing by cattle, sheep, deer, elk, antelope, or bighorn tends to decrease wax currant, Arizona fescue, and other palatable grasses. These sites produce some forage for livestock grazing, but they are typically steep and far from water, therefore largely unsuitable for livestock. Deer and elk make some use of these sites, for what little hiding cover and browse/forage they provide.

Horizontal obstruction is moderately low to moderate, so hiding cover potential for deer is moderate, and deer mostly use these sites because of available browse. Mule deer use community type A for cover, browse, and rest during mild to moderate winters, though their use is low during severe winters. They may overnight on sites in spring and fall at moderate rates. Their winter use of community types B and C is low during mild and moderate winters, and moderate to low in spring

and fall, when they may overnight there. Deer and elk use these sites for resting because of the wide views afforded from most locations. Elk use is low in all seasons and for all community types. This type is useful for sage grouse mainly as summer range, though most sites are too steep and lack cover, especially sagebrush. Nesting use is low and summer use is moderately low.

Historically, there has been very little recreation in these stands, but they are suitable for facilities or development only where slope angles are low.

Summary of Ecological Type Characteristics

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

Number of Samples	8, soil descriptions from 3 of these; 1 more that doesn't fit into a community type (total 9)
Elevation	9,985 ft (9,440-10,380 ft); 3,043 m (2,877-3,164 m)
Average Aspect	143°M (r = 0.78)
Lithology	Rhyolite [63%] or tuff
Formations[1]	Tpl [63%] or Taf
Landforms	Soil creep slopes
Slope Positions	Backslopes and upper backslopes
Slope Shapes	Linear both horizontally and vertically
Slope Angle	26.1% (9-51%)
Soil Parent Material	Colluvium
Coarse Fragments	42.7% (10-90%) cover on surface, 54.2% (35-68%) by volume in soil
Soil Depth	71 cm (62-75 cm); 27.8 in (24-30 in)
Mollic Thickness	9 cm (0-13 cm); 3.4 in (0-5 in)
Texture	Loam surface, sandy clay loam to loam subsurface
Soil Classification	Cryoborolls [50%], Cryorthents, and Cryochrepts
Total Live Cover	107.2% (80.9-154.4%)
Number of Species	25.5 (20-32)
Total Live Cover/No. Species	4.2% (3.1-5.3%)
Climate	Deep rainshadow, restricted to southern and southeastern portions of the Basin. Cold, moderately exposed to sun, moderately exposed to wind, dry to very dry because cold and coarse.
Water	Dry to very dry microclimate, but vegetation cover and coarse fragments hold some moisture through the season on better-condition sites. No permanent water on or near sites.

Key to Community Types

1. Parry oatgrass >5% cover. Arizona fescue *and* mountain muhly both >20% cover. Total graminoid cover >50% ..... **A**
1. Parry oatgrass 0-5% cover. Arizona fescue and mountain muhly both present, but one or both <20% cover. Total graminoid cover <50% ..... (2)

2. Wax currant usually >5%, always >2% cover. Parry oatgrass absent or <1% cover ..... **B**
2. Wax currant absent or <5% cover. Parry oatgrass >2% cover ..... **C**

Description of Community Types

A *Bristlecone pine-mountain muhly-Arizona fescue-wax currant-Parry oatgrass* is represented by only one plot, but it is clearly the highest seral stage in the sample. Bristlecone pine has 55% cover, wax currant 5%, Parry oatgrass 8%, Arizona fescue 20%, and mountain muhly 25%.

B *Bristlecone pine-wax currant-Arizona fescue* has the most conspicuous tall-shrub layer of wax currant, 2.5-20% cover. Arizona fescue and mountain muhly are always present, but sometimes one or both of these is sparse. Parry oatgrass is absent or <1% cover.

C *Bristlecone pine-Arizona fescue-mountain muhly* always has Arizona fescue and mountain muhly, but sometimes one or both of these is sparse. Wax currant cover is <5%; in one plot, wax currant is absent.

Plot Not Assigned to a Community Type (1)

- One plot was apparently transitional to *Douglas-fir/wax currant-Arizona fescue–Coarse thin-dark soils–Steep*, with bristlecone pine 41% cover, Douglas-fir 32%, Arizona fescue 4%, and Parry oatgrass and mountain muhly, both Trace (<1%).

Table 03-4. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly*. "|" means the same as above.			
	Sage Grouse	Mule Deer	Elk
CT	Season–Preference	Season–Preference	Season–Preference
A	Spring– Very Low Nesting–Low Summer– Mod. Low	Winter, Mild– Moderate (Cover, Browse, Rest) Winter, Severe– Low Spring/Fall– Moderate (Browse, Rest, Cover, Overnight)	Winter, Mild– Low Winter, Severe–Low Spring/Fall–Low
B, C	|	Winter, Mild– Mod. Low (Cover, Browse, Rest) Winter, Severe– Low Spring/Fall– Mod. Low (Browse, Rest, Cover, Overnight)	|

Table 03-5. Community types within *Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly*.

CT	No. Samples	Elevation, ft Slope, %	Coarse, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Lr	Layer Height, m	Avg Lyr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Obstruction %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Bristlecone pine-mountain muhly-Arizona fescue-wax currant-Parry oatgrass	1	9,880 9	*	10 6 LS		*		55 6 62 32	32 154 4.8	*
B. Bristlecone pine-wax currant-Arizona fescue	3	9,780 (9,440-9,980) 16.5 (14-21)	* * *	40 (10-90) 27 (6-65) LS		*		64 (60-66) 5 (2-8) 35 (28-42) 14 (7-18)	26 (21-29) 118 (111-124) 4.7 (4.3-5.3)	*
C. Bristlecone pine-Arizona fescue-mountain muhly	4	10,165 (9,920-10,380) 37.7 (25-51)	54 (35-68) 71 (62-75) 9 (0-13)	53 (10-90) 6 (3-10) LM	T1 T2 T3 S GF M L	6.0 (4.0-8.0) 4.7 (2.0-6.0) 3.0 (2.1-5.0) 2.2 (1.4-3.5) 0.3 (0.0-0.8) 0.0 0.0	0.2 33.5 0.8 10.2 39.8 0.4 1.7	36 (21-58) 9 (3-20) 33 (25-40) 9 (4-14)	24 (20-30) 87 (81-92) 3.7 (3.1-4.3)	50 55 50 75 57

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

Table 03-6. Resource Values for *Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly*. Resource values were calculated from the numbers in Table 03-5, 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**
Potential Cattle Forage Production	2-3	2-3	2
Grazing Suitability	1	1	1
Timber Productivity	2	2	2
Timber Suitability	1	1	1
Developed Recreation	1	1	1
Dispersed Recreation	1	1	1
Scenic	4	3	3
Road & Trail Stability	2	1-2	1
Construction Suitability	0	0	0
Deer & Elk Hiding Cover	5	5	4
Deer & Elk Forage & Browse	4	3	4
Sage Grouse Cover	3-4	3-4	3
Sage Grouse Lek Potential	1	1	1
Sage Grouse Nesting/Brood Potential	1	1	0
Sage Grouse Summer Potential	2	2	1
Need for Watershed Protection	4	3	4
Soil Stability	2	2	2
Risk of Soil Loss-Natural	4	3	4
Risk of Soil Loss-Management	4	4	4
Risk of Permanent Depletion-Range	2	1	1
Risk of Permanent Depletion-Wildlife	3	3	4
Resource Cost of Management	3	3	4

Table 03-7. Common Species in *Bristlecone pine/currant-Arizona fescue–Cold soils–Southeasterly*, 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•100%/Con.

		COMMUNITY TYPE			
		A	B	C	
		Ccv(Con)	Ccv(Con)	Ccv(Con)	
Code	Species	N = 1	3	4	Common Name
	TREES				
PIAR	Pinus aristata	55(100)	61(100)	35(100)	bristlecone pine
PIPO	Pinus ponderosa	– –	– –	T (50)	ponderosa pine
POTR5	Populus tremuloides	– –	1 (33)	T (75)	quaking aspen
	SHRUBS				
PIRI6	Picradenia richardsonii	1(100)	3 (67)	T (25)	pingue
RICE	Ribes cereum	5(100)	3 (67)	9(100)	wax currant
ROWO	Rosa woodsii	1(100)	– –	T (25)	Woods rose
	GRAMINOIDS				
CAGE	Carex geophila	1(100)	1 (33)	– –	dryland sedge
CAGE2	Carex geyeri	4(100)	3 (67)	2 (25)	elk sedge
CAXE	Carex xerantica	– –	– –	T (50)	dryland sedge
DAPA2	Danthonia parryi	8(100)	3(100)	1 (25)	Parry oatgrass
ELEL5	Elymus elymoides	– –	2 (67)	1 (75)	bottlebrush squirreltail
FEAR2	Festuca arizonica	20(100)	16(100)	13(100)	Arizona fescue
KOMA	Koeleria macrantha	3(100)	4 (67)	4 (50)	prairie junegrass
MUMO	Muhlenbergia montana	25(100)	10(100)	13(100)	mountain muhly
	FORBS				
ANSE4	Androsace septentrionalis	1(100)	T(100)	T (50)	northern rock-jasmine
ANPA	Anemone parviflora	1(100)	3 (33)	– –	arctic anemone
ARFR4	Artemisia frigida	– –	3(100)	5 (25)	fringed sagewort
BODR	Boechera drummondii	T(100)	T (33)	– –	false-arabis
CHDO	Chaenactis douglasii	1(100)	1 (33)	1 (25)	pincushion
DEIN5	Descurainia incana	1(100)	1 (67)	– –	Richardson tansy mustard
DRAU	Draba aurea	1(100)	T (67)	– –	golden whitlow-wort
ERSU2	Erigeron subtrinervis	1(100)	2 (33)	1 (25)	threenerve fleabane
GECA3	Geranium caespitosum	– –	2(100)	3 (25)	Fremont geranium
HEVI4	Heterotheca villosa	– –	T (67)	1 (25)	hairy golden aster
IPAG	Ipomopsis aggregata	– –	T (33)	1 (25)	trumpet gilia
LUAR3	Lupinus argenteus	– –	– –	7 (50)	silvery lupine
MACA2	Machaeranthera canescens	18(100)	– –	– –	hoary aster
MELA3	Mertensia lanceolata	– –	T (67)	3 (25)	lanceleaf bluebells
PANE7	Packera neomexicana	– –	1 (67)	1 (25)	New Mexico groundsel
PATR7	Packera tridenticulata	– –	– –	1 (50)	groundsel
POHI6	Potentilla hippiana	1(100)	2(100)	1 (50)	horse cinquefoil
POPU9	Potentilla pulcherrima	1(100)	1 (33)	– –	beauty cinquefoil
SOMU	Solidago multiradiata	– –	T (67)	– –	mountain goldenrod
TAOF	Taraxacum officinale	T(100)	T (33)	– –	common dandelion
	GROUND COVER				
BARESO	bare soil	6(100)	27(100)	6(100)	
LITTER	litter and duff	84(100)	33(100)	41(100)	
GRAVEL	gravel 0.2-10 cm	–	–	17	
COBBLE	cobble 10-25 cm	– –	– –	6 (75)	
STONES	stone > 25 cm	– –	– –	1 (25)	
MOSSON	moss on soil	– –	– –	1 (25)	
LICHENS	lichens on soil	3	3	4	

Bristlecone pine/Thurber fescue–Cryic soils–Subalpine slopes, > 11,000 ft

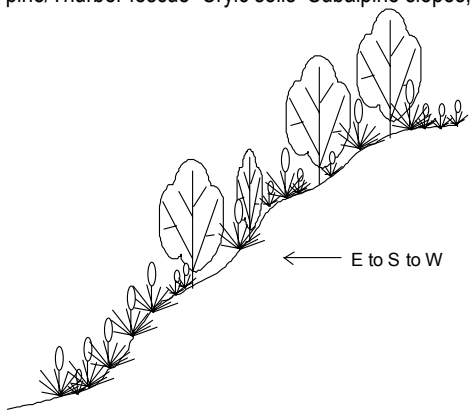

Figure 03-2. Cross-section of vegetation structure of *Bristlecone pine/Thurber fescue–Cold soils*. Aspects are southerly, and slope angles average 35%.

Bristlecone pine/Thurber fescue–Cold soils is an unusual type found on subalpine slopes above 11,000 feet elevation, within deep rainshadows in areas with cold soils. Bristlecone pine (PIAR) and Thurber fescue (FETH) characterize the type; Parry oatgrass (DAPA2) may be present as well. It is found on moderate to moderately steep slopes in deep rainshadows of the Subalpine zone of the UGB. It has been described from the east (leeward, rainshadow) side of mountain ranges in northern and southern Colorado and northern New Mexico.

Deep, loamy soil in Thurber fescue patches may make soil loss a limitation. Ecotones are usually to mountain sagebrush (ARTRV)/Thurber fescue or Thurber fescue/Arizona fescue communities on gentler slopes, or to fir-spruce (ABBI2-PIEN) stands on more protected slopes.

Stands in this series typically support moderately sparse to moderately dense bristlecone pine trees. Several other species may be mixed in with the pines, such as aspen (POTR5), Engelmann spruce (PIEN), Douglas-fir (PSME) or limber pine (PIFL2), but these are always subordinate to bristlecone pine. Few shrubs occur other than occasional common junipers (JUCO6). The herbaceous grass-forb layer is usually well represented, and Thurber fescue cover is usually >10%. The grasses usually hide the few low shrubs. See Table 03-10 for common species names and codes.

This type is related to *Douglas-fir/Thurber fescue–Cold dark soils–Gentle*, which occurs on warmer, more productive slopes at elevations below 11,000 feet. One plot, which was not assigned to a community type, seems to be transitional between the two types. *Pinus aristata/Festuca thurberi* of De Velice (1985) is similar to *Pinus aristata/Calamagrostis purpurascens (*Terwilliger 1979). Where *Festuca thurberi* is more constant and more dominant, communities with CAPU2 might be a phase of this type. Seral communities may last 1,300 years, and succession is very slow, especially in the trees. Changes in the grasses and shrubs are somewhat easier to see, but recovery from disturbance is very slow. Because recovery from disturbance is so slow, no tree management is recommended.

Sites are suitable for use as cattle range, but their steepness, distance to water, and low productivity reduce their usefulness. Moderately heavy to heavy grazing by cattle, sheep, deer, or elk tends to decrease Thurber fescue and Parry oatgrass.

There is typically very little browse. Sites are unavailable to big game in winter because of snow accumulation. Mule deer generally find the sites too high, though elk will use them for forage and travel. Mule deer use is moderate spring through fall for occasional overnight stays and foraging and very low in winter. Elk use is also very low in winter and moderately low in spring through fall for foraging and rest. The sites are unsuitable for bighorn sheep range except for transition. Horizontal obstruction is moderately high to high, so hiding cover potential for deer and elk is moderate, especially below 1.5 m. The sites are inaccessible to sage grouse.

Sites are also useable for developed or dispersed recreation on less steep slopes, but their exposure to wind decreases their appeal.

Summary of Ecological Type Characteristics

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

NUMBER OF SAMPLES	2, soil descriptions from 1 of these; 1 more that doesn't fit into a CT (total 3)
ELEVATION	11,190 ft (10,520-11,860 ft); 3,411 m (3,206-3,615 m)
AVERAGE ASPECT	143°M (r = 0.78)
LITHOLOGY	Tuff, granite, breccia
FORMATIONS[1]	Taf, Xg, Tpl
LANDFORMS	Soil creep slopes
SLOPE POSITIONS	Backslopes
SLOPE SHAPES	Convex to linear horizontally, Linear vertically
SLOPE ANGLE	34.5% (21-48%)
SOIL PARENT MATERIAL	Colluvium
COARSE FRAGMENTS	9.2% (2-16%) cover on surface, 0.0% (66-66%) by volume in soil
SOIL DEPTH	81 cm; 32 in
MOLLIC THICKNESS	25 cm; 10 in
TEXTURE	Sandy clay loam surface, sandy clay subsurface
SOIL CLASSIFICATION	Cryoborolls or Cryochrepts
TOTAL LIVE COVER	161.0% (112.9-209.1%)
NUMBER OF SPECIES	35.5 (28-43)
TOTAL LIVE COVER/NO. SPECIES	5.0% (2.6-7.5%)
CLIMATE	In deepest rainshadow, in the far southeastern portion of the Basin. Subalpine, cold to very cold, moderately to highly exposed to sun, moderately to highly exposed to wind.
WATER	Cold, moderately dry microclimate. Vegetation cover holds significant moisture in the soil through the season on most sites. No permanent water on or near sites.

Community Type Description

A *Bristlecone pine-Thurber fescue* has a well-developed graminoid layer, with Thurber fescue conspicuous at >15% cover.

Plot Not Assigned to a Community Type (1)

- A community transitional to *Douglas-fir/Thurber fescue–Cold dark soils–Gentle*, with bristlecone pine dominant, but sharing dominance with Douglas-fir; there is usually some common juniper mixed with Thurber fescue in the understory.

Table 03-8. Community types within *Bristlecone pine/Thurber fescue–Cold soils*.

CT	No. Samples	Elevation, ft Slope, %	Coarse, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Lr	Layer Height, m	Avg Lyr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Obstruction %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Bristlecone pine-Thurber fescue	2	11,190 (10,520-11,860) 34.5 (21-48)	66 81 25	9 (2-16) 3 (1-6) LS	T1 T2 T3 S1 S2 GF	11 (9-12) 5 (1-9) 0.7 (0.0-1.5) 1.4 (0.7-2.0) 0.5 (0.0-0.7) 0.3 (0.0-0.7)	70 T 3 T T 79	64 (55-73) 4 (4-5) 75 (24-126) 17 (6-29)	36 (28-43) 161 (113-209) 5.0 (2.6-7.5)	40 55 50 75 55

Table 03-9. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Bristlecone pine/Thurber fescue–Cold soils*. "|" means the same as above.

CT	Sage Grouse Season–Preference	Mule Deer Season–Preference	Elk Season–Preference
A	Spring– Very Low Nesting–Low Summer– Mod. Low	Winter, Mild– Moderate (Cover, Browse, Rest) Winter, Severe– Low Spring/Fall– Moderate (Browse, Rest, Cover, Overnight)	Winter, Mild– Low Winter, Severe–Low Spring/Fall–Low

Table 03-10. Resource Values for *Bristlecone pine/Thurber fescue–Cold soils*. Resource values were calculated from the numbers in Table 03-8, 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		Community Type
Resource Value	**A**	**Resource Value**	**A**
Potential Cattle Forage Production	3	Deer & Elk Forage & Browse	3
Grazing Suitability	1-2	Need for Watershed Protection	4
Timber Production	2	Soil Stability	2-3
Timber Suitability	1	Risk of Soil Loss-Natural	3-4
Developed Recreation	2	Risk of Soil Loss-Management	4-5
Dispersed Recreation	3	Risk of Permanent Depletion-Range	3-4
Scenic	3	Risk of Permanent Depletion-Wildlife	2
Road & Trail Stability	2	Resource Cost of Management	3-4
Construction Suitability	1	Cost of Rehabilitation	4
Deer & Elk Hiding Cover	4-5		

A bristlecone pine/Thurber fescue stand in late seral, community type A. Bristlecone pine 70% cover, Thurber fescue 50%, Parry oatgrass 37%, blunt sedge 23%, Arizona fescue 10%. Coarse Fragments Cover = 17%, Total Live Cover = 209%, Coarse Fragments in Soil = 64. Elk Park Quadrangle, elevation 10,520 ft, 48% 122° (SE) slope. September 26, 1994.

Table 03-11. Common Species in *Bristlecone pine/Thurber fescue–Cold 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•100%/Con.

		COMMUNITY TYPE A Ccv (Con)	
Code	Species	N = 2	Common Name
	TREES		
PIEN	Picea engelmannii	15 (50)	Engelmann spruce
PIAR	Pinus aristata	55 (100)	bristlecone pine
POTR5	Populus tremuloides	3 (50)	quaking aspen
	SHRUBS		
JUCO6	Juniperus communis	4 (50)	common juniper
RICE	Ribes cereum	4 (50)	wax currant
RIMO2	Ribes montigenum	1 (50)	mountain gooseberry
ROWO	Rosa woodsii	T (50)	Woods rose
	GRAMINOIDS		
AGSC5	Agrostis scabra	T (50)	rough bentgrass
CAPU	Calamagrostis purpurascens	1 (50)	purple pinegrass
CAFO3	Carex foenea	1 (50)	silvertop sedge
CAOB4	Carex obtusata	23 (50)	blunt sedge
DAPA2	Danthonia parryi	37 (50)	Parry oatgrass
ELTR7	Elymus trachycaulus	2 (50)	slender wheatgrass
FEAR2	Festuca arizonica	10 (50)	Arizona fescue
FETH	Festuca thurberi	32 (100)	Thurber fescue
KOMA	Koeleria macrantha	2 (100)	prairie junegrass
MUMO	Muhlenbergia montana	3 (50)	mountain muhly
POFE	Poa fendleriana	1 (100)	muttongrass
POGL	Poa glauca	3 (50)	Greenland bluegrass
TRSP2	Trisetum spicatum	T (50)	spike trisetum
	FORBS		
ACLA5	Achillea lanulosa	2 (50)	western yarrow
ALLIU	Allium	2 (50)	onion
AMLA6	Amerosedum lanceolatum	1 (50)	yellow stonecrop
ANPA	Anemone parviflora	2 (50)	arctic anemone
ARFR4	Artemisia frigida	T (50)	fringed sagewort
ARLU	Artemisia ludoviciana	1 (50)	Louisiana sagewort
ASAG2	Astragalus agrestis	2 (50)	purple milkvetch
CARO2	Campanula rotundifolia	T (50)	common harebell
CEFO2	Cerastium fontanum	T (50)	mouse-ear
CHDA2	Chamerion danielsii	1 (50)	fireweed
CISC3	Cirsium scopulorum	T (50)	Alpine thistle
DRAU	Draba aurea	T (50)	golden whitlow-wort
ERFE3	Eremogone fendleri	1 (50)	desert sandwort
EREL9	Erigeron elatior	2 (50)	tall fleabane
ERPE3	Erigeron peregrinus	2 (50)	peregrine fleabane
ERPI6	Erigeron pinnatisectus	1 (50)	pinnate fleabane
ERSU2	Erigeron subtrinervis	T (50)	threenerve fleabane
FRVI	Fragaria virginiana	T (50)	Virginia strawberry
FRSP	Frasera speciosa	2 (50)	monument plant
GEAC2	Gentianella acuta	T (50)	little gentian
HEVI4	Heterotheca villosa	2 (50)	hairy golden aster
HEPA11	Heuchera parvifolia	T (50)	littleleaf alumroot
MAST4	Maianthemum stellatum	T (50)	star Solomon-plume
MELA3	Mertensia lanceolata	T (50)	lanceleaf bluebells
NOMO2	Noccaea montana	T (50)	candytuft
ORAL	Oreoxis alpina	2 (50)	alpine-parsley
PAWE4	Packera werneriifolia	1 (50)	groundsel
PODO4	Polygonum douglasii	T (50)	Douglas knotweed
POHI6	Potentilla hippiana	1 (100)	horse cinquefoil
POPU9	Potentilla pulcherrima	2 (50)	beauty cinquefoil
PSMO	Pseudocymopterus montanus	2 (50)	mountain parsely
PUPA5	Pulsatilla patens	2 (50)	American pasque flower
TRDA2	Trifolium dasyphyllum	2 (50)	whiproot clover
	GROUND COVER		
BARESO	bare soil	3 (100)	
LITTER	litter and duff	87 (100)	
GRAVEL	gravel 0.2-10 cm	2	
COBBLE	cobble 10-25 cm	12 (50)	
STONES	stone > 25 cm	1 (50)	
LICHENS	lichens on soil	6	