

# Field Key to Ecological Systems and Target Alliances of the Colorado Rocky Mountains, United States

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Terrestrial Ecology Department  
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**Contacts:**

Pat Comer, Chief Terrestrial Ecologist, 303-541-0352, [pat\\_comer@natureserve.org](mailto:pat_comer@natureserve.org)

Keith Schulz, Regional Vegetation Ecologist, 303.541.0356, [keith\\_schulz@natureserve.org](mailto:keith_schulz@natureserve.org)

Marion Reid, Senior Regional Ecologist, 303.541.0342, [marion\\_reid@natureserve.org](mailto:marion_reid@natureserve.org)

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## Introduction

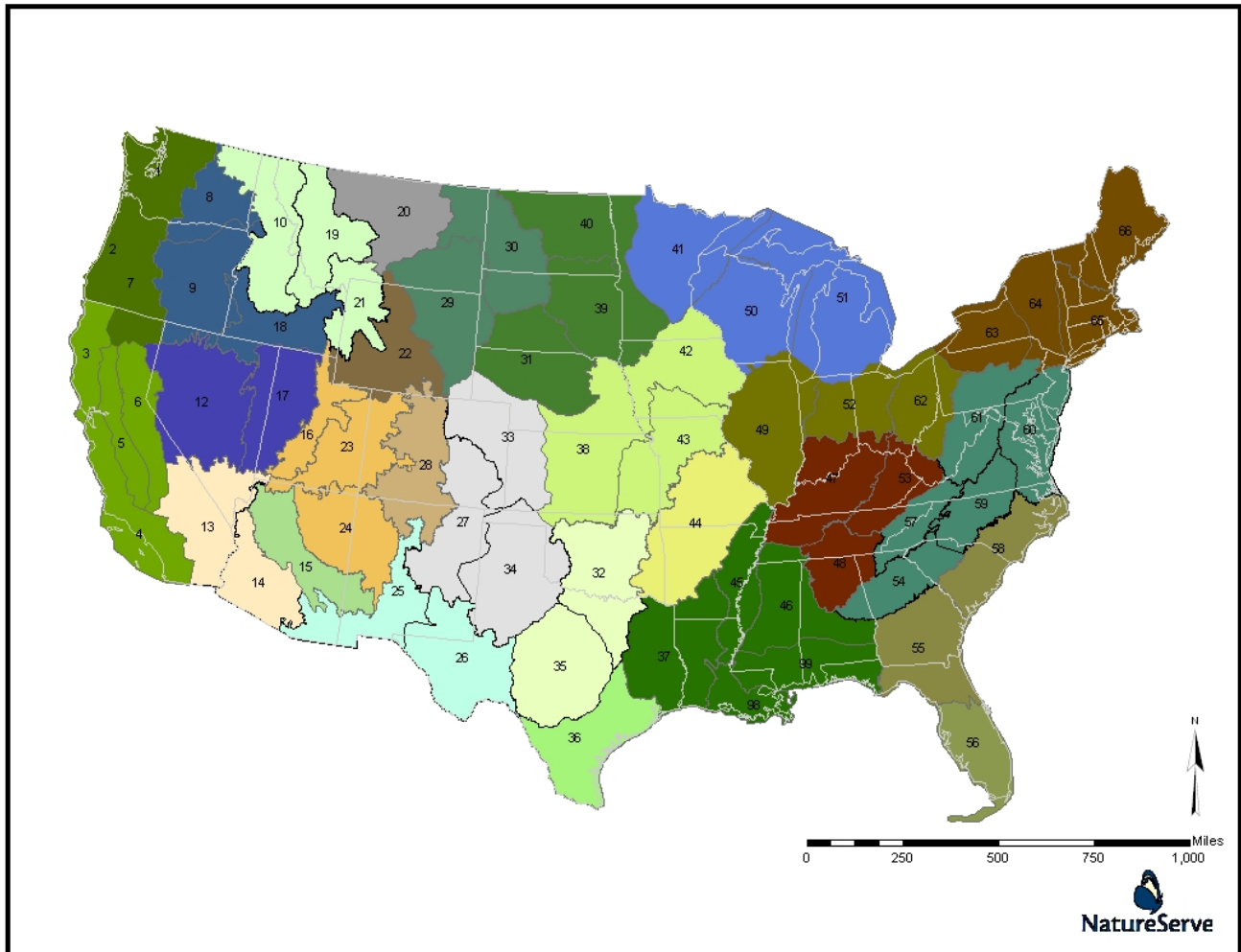
The following keys to NatureServe ecological systems and selected US-NVC vegetation alliances cover the areas found in NLCD map zone 28 (the Colorado Rocky Mountains). The systems and alliances included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation in the Colorado Rocky Mountains (Figure 1). Some types are in the keys that characteristically occur at small spatial scales (generally <2 ha in size) and hence may not be mappable by the LANDFIRE project. However, we have chosen to be inclusive in the keys, so that the user will have information on these system types for comparison purposes. In some cases they may be important for modeling fire condition class and, given their relative distinctiveness on the landscape, they may indeed be mappable.

Plant names are almost always in Latin and follow the nomenclature of Kartesz (1999). In limited cases, we have included synonyms for some taxa.

The keys are “dichotomous”, which means the user follows the order of the ‘couplets’ and makes a choice between the 2 options represented in the couplet. The ordering of the couplets in each key does matter, and the user should choose the option in each couplet that best fits the data or field situation. A choice leads the user to the next couplet to be utilized in the keying process, via a number at the far right, or else leads to a final result (an ecological system type or an alliance).

If the choice the user makes leads to a “result”, then either an Ecological System is named or a Vegetation Alliance is named. Alliances are recognizable because “alliance” is in the name, and they all start with one or more Latin names (e.g. *Pinus ponderosa* Woodland Alliance).

Systems do not include Latin species names in them, and always start with a Biogeographic region (e.g. Columbia Plateau Steppe and Grassland). If an ecological system is followed by a number in parentheses, then the couplet so numbered is to alliances that are part of the system and which may be mappable.



**Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.**

All the keys follow the same logic. First the user determines if the vegetation (or land cover) is ‘sparse’; if not then you go to Key A and are lead into riparian or wetland woodlands or shrublands, then to upland deciduous forest/woodlands, then to upland coniferous forests/woodlands, then savannas, then shrublands and shrub-steppe. The second section of each key (Key B) is for the herbaceous systems and alliances, and keys through wetland/riparian situations first.

Keys are generally based on dominance within vegetation strata, with tree cover generally considered first, then that of shrubs, then the herbaceous component. Codominant species within a given strata are important as well, in some cases a system type or alliances will have 2 or more codominant species, which may or may not be present in all stands. Many ecological systems will have a variable physiognomy; where appropriate these variable systems have been placed into the keys in several places (i.e. some grassland systems have a “shrub-steppe” physiognomy and hence will be in the key both as shrub-steppe and herbaceous). Some terminology is commonly employed throughout the keys that distinguish general spatial characteristics of the vegetation or environmental setting. For example ‘matrix’ types of

vegetation are dominant across the majority of a given landscape, while ‘large patch’ types tend to occur as distinctive patches within the larger ‘matrix.’ Elevation-based life zones are commonly employed, with reference to ‘alpine,’ ‘subalpine,’ ‘montane,’ or ‘foothill’ zones. These zones vary in actual elevational thresholds across multiple map zones, and within individual map zones. More precise definition of these elevation breaks by map zone could be accomplished with additional research.

In the next section of the document we have provided a table showing the LANDFIRE legend units that represent non-natural vegetation and a short description for each of them. They are not formally incorporated into the keys, since they are typically recognizable without the use of a key, or else their floristic composition is so variable as to be not useful in a field key. Our primary purpose was to provide keys for the natural and near-natural vegetation of these zones.

## Land Use, Unvegetated, Semi-natural and Altered Vegetation

<b>LAND USE OR UNVEGETATED SURFACES</b>	
<b>Open Water</b>	Open water
<b>Developed</b>	Generally developed lands.
Developed, Open Space	Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.
Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units.
Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units
Developed, High Intensity	Includes highly developed areas where people reside in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100% of the total cover.
<b>Agriculture</b>	Generally developed for agricultural uses.
Pasture/Hay	These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type.
Cultivated Crops and Irrigated Agriculture	These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.
<b>Perennial Ice/Snow</b>	
<b>SEMI-NATURAL / ALTERED VEGETATION</b>	
<b>Ruderal Vegetation</b>	Vegetation resulting from succession following significant anthropogenic disturbance of an area. It is generally characterized by unnatural combinations of species (primarily native species, though they often contain slight or substantial numbers and amounts of species alien to the region as well)
Ruderal Upland - Old Field	
Ruderal Upland - Abandoned Tree Plantation	
Ruderal Wetland	
<b>Introduced Vegetation</b>	Vegetation dominated by introduced species. These are spontaneous, self-perpetuating, and not (immediately) the result of planting, cultivation, or human maintenance. Land occupied by introduced vegetation is generally permanently altered (converted) unless restoration efforts are undertaken.

Introduced Upland Vegetation - Treed	Land cover is significantly altered/disturbed by introduced tree species.
Introduced Upland Vegetation - Shrub	Land cover is significantly altered/disturbed by introduced woody and/or herbaceous vegetation.
Introduced Upland Vegetation - Annual and Biennial Forbland	Land cover is significantly altered/disturbed by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable. Typical species that dominate these areas are <i>Centaurea repens</i> , <i>Chrysanthemum leucanthemum</i> , <i>Cirsium arvense</i> , <i>C. vulgare</i> , <i>Euphorbia esula</i> , <i>Lepidium latifolia</i> , <i>Cardus nutans</i> , <i>Centaurea spp (difusa, solstitialis)</i> , <i>Salsola kali</i> , <i>Kochia scoparia</i> , <i>Halogeton glomeratus</i> , <i>Melilotus officinalis</i> , <i>M. albus</i> , and <i>Cardaria officinalis</i> .
Introduced Upland Vegetation – Annual Grassland	Land cover is significantly altered/disturbed by introduced annual grasses. Natural vegetation types are no longer recognizable. Typical species include <i>Bromus japonicus</i> , <i>B. rigidus</i> , <i>B. rubens</i> , <i>B. tectorum</i> , <i>Taeniatherum caput-medusae</i> , and/or <i>Schismus barbatus</i> .
California Annual Grassland	Land cover dominated by introduced, non-native annual grasses within the central valley and coastal portions of California. Natural vegetation types are no longer recognizable. Grass and forb species include <i>Bromus spp.</i> (e.g., <i>madritensis</i> , <i>diandris</i> , <i>hordeaceus</i> ), <i>Eschschlozia californica</i> , <i>Aira caryophylla</i> , <i>Lasthenia spp.</i> , <i>Castilleja spp.</i> , <i>Avena spp</i> , <i>Mesembryanthemum</i> , <i>Malephora</i> , and/or <i>Carpobrotus</i> , commonly referred to as 'iceplant.' The native shrubs <i>Ambrosia chamissonis</i> , <i>Eriogonum latifolium</i> , and/or <i>Abronia latifolia</i> may be present as emergents. <i>Poa douglasii</i> may also be present.
Introduced Upland Vegetation - Perennial Grassland and Forbland	Land cover is significantly altered/disturbed by introduced, non-native perennial grasses and forbs. Natural vegetation types are no longer recognizable. Grass species include <i>Agropyron cristatum</i> , <i>Poa bulbosa</i> , <i>Bromus inermis</i> , <i>Phleum pratense</i> , and <i>Poa pratensis</i> . Forbs may include: <i>Centarea spp.</i> , <i>Cirsium arvense</i> , <i>Euphorbia esula</i> , <i>Lepidium spp.</i> , <i>Melilotus spp.</i>
Introduced Riparian Vegetation	Land cover is altered/disturbed and dominated by introduced woody vegetation (woodlands and shrublands). Typical riparian trees and shrubs include <i>Elaeagnus angustifolia</i> , <i>Tamarix spp.</i> , <i>Triadica sebifera</i> , etc.
Introduced Wetland Vegetation	Land cover is altered/disturbed and dominated by introduced wetland vegetation. Species may include <i>Lythrum salicaria</i> , <i>Phalaris arundancea</i> , <i>Phragmites australis</i> , etc.
<b>Modified/Managed Vegetation</b>	Vegetation resulting from management or modification of natural/near natural; vegetation, but producing a structural and floristic combination not clearly known to have a natural analogue. Modified vegetation may be easily restorable by either management, restoration of ecological processes, and/or succession.
Modified/Managed Upland Vegetation	Land cover is apparently managed/modified and dominated by trees and/or shrubs. Vegetation is a mixture of herbaceous, shrub, and tree species.
Recently Burned Forest and Woodland	Land cover is apparently modified by recent fires which have burned forest and woodland vegetation. Vegetation is a mixture of herbaceous, shrub, and tree species.
Recently Burned Shrubland	Land cover is apparently modified by recent fires which have shrubland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Recently Burned Grassland	Land cover is apparently modified by recent fires which have burned grassland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Managed Tree Plantation	Land cover is apparently modified and appears as a managed tree plantation.
Recently Logged Timberland	Land cover is apparently modified and appears as logged timberland.
Modified/Managed Wetland Vegetation	These areas include created and obviously managed wetlands of varying size resulting from water diversion. Artificial Wetlands will be mapped where obvious built structures may be distinguished from imagery.

## Southern Rocky Mountain Ecological Systems and Target Alliances

This key is intended for identifying Ecological Systems and selected alliances that are found in the Southern Rocky Mountains from northern New Mexico to Southern Wyoming (Mapping Zone# 28). Additional alliance couplets are to proposed mappable or target alliances and are not intended to be comprehensive.

**Please note the following conventions used to designate the systems and alliances:**

- \* indicates NS ecological system that has been grouped into a broader LANDFIRE Map Unit (wetland, riparian, and sparsely vegetated circumstances). Included to help clarify key, but crews need to record broader LANDFIRE Map Unit (\*\*)
- \*\* indicates broader LANDFIRE Map Unit.
- \*\*\* typically a small patch ecological system type not being mapped by LANDFIRE.
- \*\*\*\* the alliance is not considered to be mappable for LANDFIRE purposes.

- 1a. Total woody canopy cover generally 10% or more .....  
..... **GO TO KEY A: Woodland, Savanna, Shrub Steppe, or Shrubland Systems and Alliances**
- 1b. Total woody canopy cover generally less than 10% .....2
- 2a. Total canopy cover generally 10% or more.....**GO TO KEY B: Herbaceous Systems and Alliances**
- 2b. Total canopy cover generally less than 10% or annual herbaceous cover dominates vegetation.....  
..... **Sparse Vegetation (3)**
- 3a. Barren and typically sparsely vegetated alpine substrates .....4
- 3b. Barren and sparsely vegetated substrates NOT alpine .....6
- 4a. Land cover is ice or exposed rock (usually > 90% cover of either bedrock, boulders or scree).....5
- 4b. Land cover has significant amounts (10-50% cover) of vascular herbaceous vegetation (typically dominated by cushion plants) and exposed rock (50-90% % cover ). Sites are windswept by prevailing winds and snow does not remain long .....**Rocky Mountain Alpine Fell field**
- 5a. Land cover is mostly exposed rock (usually > 90% cover of either bedrock, boulders or scree). Non-vascular cover (lichens) may be significant..... **(Rocky Mountain Alpine Bedrock and Scree\*)**  
..... **Rocky Mountain Alpine/Montane Sparsely Vegetated Systems\*\***
- 5b. Land cover is ice or pement snowfield.....**North American Alpine Ice Field**
- 6a. Land cover is bottomland or drainages .....7
- 6b. Land cover is upland dune, mudstone or shale badlands, volcanic rock outcrop or cinder site .....8
- 7a. Land cover is a barren to sparsely vegetated playa .....  
..... **(Inter-Mountain Basins Playa) \***  
.....**Inter-Mountain Basins Sparsely Vegetated Systems \*\***
- 7b. Land cover is a restricted to drainages with a variety of sparse or patchy vegetation including *Sarcobatus vermiculatus*, *Ericameria nauseosa*, *Fallugia paradoxa*, *Artemisia cana ssp. cana* or *Grayia spinosa*. Herbaceous vegetation such as perennial grasses, *Distichlis spicata* or *Sporobolus airoides*, may also dominate wash.....**(Inter-Mountain Basins Wash\*\*\*)**  
.....**Inter-Mountain Basins Sparsely Vegetated Systems\*\***
- 8a. Land cover is volcanic in origin (includes lava, cinder, ash deposits) .....  
..... **(Inter-Mountain Basins Volcanic Rock and Cinder Land\*)**  
.....**Inter-Mountain Basins Sparsely Vegetated Systems\*\***

8b. Land cover is not sparsely vegetated volcanic substrate .....	9
9a. Land cover is non-volcanic, consolidated rock (cliffs, outcrops).....	10
9b. Land cover is unconsolidated material.....	12
10a. Land cover is largely exposed sedimentary bedrock and scree found in the canyon and plateaus on the extreme Western Slope (generally below 2000m elevation) in transition between Rocky Mountains and Colorado Plateau .....	(Colorado Plateau Mixed Bedrock Canyon and Tableland*)
.....	Inter-Mountain Basins Sparsely Vegetated Systems**
10b. Land cover is largely exposed bedrock and scree from a variety of parent materials that is found throughout the Rocky Mountain Region .....	11
11a. Land cover is largely exposed bedrock and scree found in the Rocky Mountain (generally above 2000m elevation).....	(Rocky Mountain Cliff, Canyon and Massive Bedrock*)
.....	Rocky Mountain Alpine/Montane Sparsely Vegetated Systems**
11b. Land cover is largely exposed bedrock and scree. It is NOT found within the Rocky Mountains, but it would be appropriate to classify lower elevation outcrops along the northwestern boundary of the region (outside the Colorado Plateau Region).....	(Inter-Mountain Basins Cliff and Canyon*)
.....	Inter-Mountain Basins Sparsely Vegetated Systems**
12a. Land cover is active and/or partially vegetated (stabilized) dunes or sand sheets.....	(Inter-Mountain Basins Active and Stabilized Dune*)
.....	Inter-Mountain Basins Sparsely Vegetated Systems**
12b. Land cover is NOT dunes or sand sheets .....	13
13a. Land cover is eroded shale or clay hills .....	(Inter-Mountain Basins Shale Badland*)
.....	Inter-Mountain Basins Sparsely Vegetated Systems **
13b. Land cover is barren, but not as above (review land use and disturbed classes) .....	(Undifferentiated Barren*)
.....	Inter-Mountain Basins Sparsely Vegetated Systems**

**KEY A (Southern Rocky Mountain): Woodland, Savanna, Shrub Steppe or  
Shrubland Ecological Systems and Mappable Alliances  
(Woody cover > 10% cover present)**

- 1a. Land cover is restricted to drainages, semi-riparian flats, springs or seeps and areas with high water tables.....2
- 1b. Land cover is upland vegetation without seeps and areas with high water tables.....7
  
- 2a. Higher elevation woodlands and shrublands generally >2600 m (upper montane-subalpine-alpine) .....3
- 2b. Middle and lower elevation (generally <2600 m) woodlands and shrublands (lower montane to valleyfloor) .....4
  
- 3a. Woodlands restricted to drainages, steam terraces, semi-riparian flats and spring or seep fed slopes .....  
 ..... **(Rocky Mountain Subalpine - Montane Riparian Woodland\*)**  
 ..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems\*\***
- 3b. Shrublands restricted to drainages, stream terraces, semi-riparian flats and spring or seep fed slopes.  
 Species of *Salix*, *Alnus* or *Betula* are commonly present.....  
 ..... **(Rocky Mountain Subalpine - Montane Riparian Shrubland\*)**  
 ..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems\*\***
  
- 4a. Lower montane – foothill woodlands and shrublands restricted to drainages, semi-riparian flats and spring  
 or seep fed slopes ..... **(Rocky Mountain Lower Montane Riparian Woodland and Shrubland\*)(5)**  
 ..... **Rocky Mountain Montane Riparian Systems \*\***
- 4b. Valley bottom shrublands restricted to temporarily flooded drainages and flats .....6
  
- 5a. Woodlands restricted to drainages and semi-riparian flats that are dominated by introduced *Elaeagnus*  
*angustifolia*..... **(Elaeagnus angustifolia Semi-Natural Woodland Alliance\*)**  
 ..... **Invasive Riparian Woodland and Shrubland\*\***
- 5b. Woodlands and shrublands restricted to drainages and semi-riparian flats that are dominated by *Tamarix*  
 spp ..... **(Tamarix spp. Semi-Natural Temporarily Flooded Shrubland Alliance\*)**  
 ..... **Invasive Riparian Woodland and Shrubland\*\***
  
- 6a. Open to moderately dense shrublands dominated or codominated by *Sarcobatus vermiculatus* that are  
 widespread in the Intermountain Basins region but restricted to valley bottoms in Southern Rocky  
 Mountains, such as the San Luis Valley in Colorado. *Atriplex canescens*, *Atriplex confertifolia*, or  
*Krascheninnikovia lanata* may be present to codominant with patches of *Distichlis spicata* grasslands.  
 Commonly occurs on saline/alkaline plains and basins, sometimes encircling playas or on stream terraces.....  
 ..... **Inter-Mountain Basins Greasewood Flat**
- 6b. Open to moderately dense shrublands dominated by one or more species of *Atriplex* and/or  
*Krascheninnikovia lanata*. *Sarcobatus vermiculatus* is absent or has low cover. Other shrubs present to  
 codominate including *Artemisia tridentata ssp. wyomingensis*. Typical of saline basins, alluvial slopes and  
 plains across the Intermountain western U.S extending into the Great Plains, but restricted to valley  
 bottoms in Southern Rocky Mountains, such as the San Luis Valley in Colorado.....  
 ..... **Inter-Mountain Basins Mixed Salt Desert Scrub**
  
- 7a. Upland forests and woodlands (trees generally with >25% cover) .....8
- 7b. Upland savannas (10-25% cover of trees, generally >3 m tall with a single main stem and >25% cover  
 graminoids), shrublands and shrub-steppe (10-25% cover of shrubs and >25% cover graminoids).....23
  
- 8a. Broadleaf forests and woodlands or mixed conifer-aspen forests and woodlands (deciduous trees make up  
 25-100% of the tree canopy) .....9
- 8b. Conifer forests and woodlands (deciduous trees may make up less than 25% cover of the tree canopy).....10

9a. Broadleaf forest or woodland typically dominated by <i>Populus tremuloides</i> (and possible inclusions of other broadleaf tree species) with less than 25% total tree canopy cover of conifers.....	
	<b>Rocky Mountain Aspen Forest and Woodland</b>
9b. Mixed conifer-broadleaf forests and woodlands co-dominated by <i>Populus tremuloides</i> and a conifer trees with 25-75% relative tree canopy of each canopy type. These mixed stands are more common on Western Slope plateaus.....	<b>Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland (16)</b>
10a. Subalpine conifer forests and woodlands .....	<b>11</b>
10b. Montane and foothills conifer forests and woodlands.....	<b>14</b>
11a. Subalpine conifer forests and woodlands dominated or co-dominated by <i>Pinus aristata</i> and/or <i>P. flexilis</i> .....	
	<b>Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland</b>
11b. Subalpine conifer forests and woodlands NOT dominated or co-dominated by <i>Pinus aristata</i> and/or <i>P. flexilis</i> .....	<b>12</b>
12a. Conifer forests and woodlands strongly dominated by <i>Pinus contorta</i> . <i>Populus tremuloides</i> may be present, but is generally <25% of tree canopy.....	<b>Rocky Mountain Lodgepole Pine Forest</b>
12b. Conifer forests and woodlands typically dominated or co-dominated by <i>Abies lasiocarpa</i> and/or <i>Picea engelmannii</i> sometimes with <i>Pinus contorta</i> codominating. <i>Populus tremuloides</i> may be present, but is generally <25% of tree canopy.....	<b>13</b>
13a. Matrix subalpine conifer forests and woodlands of relatively dry subalpine environments that are widespread in the Rocky Mountain Region.....	
	<b>Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland</b>
13b. Large and small patch subalpine conifer forests and woodlands of characteristic of relatively mesic local environments (such as north aspect toeslopes). Mesic understory species such as <i>Actaea rubra</i> , <i>Amelanchier alnifolia</i> , <i>Erigeron eximius</i> , <i>Rubus parviflorus</i> , or <i>Trifolium dasyphyllum</i> .....	
	<b>Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland</b>
14a. Montane conifer forests and woodlands.....	<b>15</b>
14b. Foothill conifer forests and woodlands .....	<b>19</b>
15a. Conifer forests and woodlands strongly dominated by <i>Pinus contorta</i> (>2/3 total tree canopy).....	
	<b>Rocky Mountain Lodgepole Pine Forest</b>
15b. Conifer forests and woodlands NOT dominated <i>Pinus contorta</i> .....	<b>16</b>
16a. Matrix <i>Pinus ponderosa</i> dominated woodlands of Rocky Mountains. May have inclusions of <i>Pseudotsuga menziesii</i> woodlands on cool aspects. <i>Pinus edulis</i> and/or <i>Juniperus</i> spp. may be present to codominant. <i>Populus tremuloides</i> may be present, but is generally <25% of tree canopy .....	
	<b>Southern Rocky Mountain Ponderosa Pine Woodland</b>
16b. Conifer forests and woodlands dominated by <i>Abies concolor</i> , <i>Picea pungens</i> , or <i>Pseudotsuga menziesii</i> , and sometime co-dominated by <i>Pinus ponderosa</i> and/or <i>P. contorta</i> . <i>Populus tremuloides</i> may be present, but is generally <25% of tree canopy .....	<b>17</b>
17a. Matrix conifer forests and woodlands characteristic of relatively dry montane environments that are widespread in the Rocky Mountain Region.....	
	<b>Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland (18)</b>
17b. Large and small patch conifer forests and woodlands typical of relatively mesic local environments (such as north aspect toeslopes) often with mesic species in the understory) .....	
	<b>Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland</b>

- 18a. Conifer forests dominated or co-dominated by *Abies concolor*. Other trees species such as *Pseudotsuga menziesii*, *Picea pungens*, *Pinus ponderosa* and/or *Populus tremuloides* may be present. Significant *Abies concolor* understory is present if mature *Abies concolor* are not codominant in tree canopy ..... **Abies concolor Forest Alliance**
- 18b. Conifer forests dominated or co-dominated by *Pseudotsuga menziesii*. *Pinus ponderosa* may be present to codominant. *Populus tremuloides* may be present, but is generally <25% of tree canopy. *Abies concolor* is not present..... **Pseudotsuga menziesii Forest Alliance\*\*\*\***
- 19a. Foothill or prairie-breaks conifer woodlands dominated by *Pinus flexilis* and/or *Juniperus scopulorum* or *Juniperus osteosperma*. Common foothills woodland in southern and eastern Wyoming, but restricted to extreme northern portions of Colorado. (*Pinus flexilis* is often present) ..... **Rocky Mountain Foothill Limber Pine-Juniper Woodland**
- 19b. Foothill conifer woodlands NOT dominated or co-dominated by *Pinus flexilis* ..... **16**
- 20a. Foothill conifer woodlands codominated by *Pinus edulis* and/or *Juniperus* spp. with *Pinus ponderosa* codominant ..... **21**
- 20b. Foothill conifer woodlands dominated by *Pinus edulis* and/or *Juniperus* spp. If present, *Pinus ponderosa* is restricted to mesic microsites ..... **21**
- 21a. Pinyon–Juniper woodlands that occur generally east of the Continental Divide from central Colorado to central New Mexico (excluding stands with Madrean tree species e.g., *Pinus cembroides*, *Pinus discolor*, *Juniperus coahuilensis*, or *Juniperus pinchotii*). *Juniperus deppeana* is not strictly Madrean. Stands are typically dominated by *Pinus edulis* and/or *Juniperus monosperma*. *Juniperus scopulorum* replaces *Juniperus monosperma* at higher elevations (San Luis Valley, Upper Arkansas River Valley) ..... **22**
- 21b. Woodlands of Colorado West slope foothills and Colorado Plateau that are dominated by *Pinus edulis* and/or *Juniperus osteosperma* with *J. scopulorum* codominant to dominant at higher elevations. *Juniperus monosperma* may codominate stand or replace *Juniperus osteosperma* in northwestern New Mexico..... **23**
- 22a. Pinyon–Juniper woodlands that occur generally east of the Continental Divide from central Colorado to central New Mexico (excluding stands with Madrean tree species e.g., *Pinus cembroides*, *Pinus discolor*, *Juniperus coahuilensis*, or *Juniperus pinchotii*). *Juniperus deppeana* is ok because not strictly Madrean Stands are typically dominated by *Pinus edulis* and/or *Juniperus monosperma*. *Juniperus scopulorum* replaces *Juniperus monosperma* at higher elevations..... **Southern Rocky Mountain Pinyon-Juniper Woodland**
- 22b. Open juniper woodlands and savannas typically with perennial graminoid layer >20%). Tree layer is dominated by *Juniperus monosperma* and/or *J. scopulorum* at higher elevations. Stands are generally restricted to lower elevation foothills of the southern Rocky Mountains, extending into the breaks in plains in southeastern Colorado and across northeastern New Mexico (excluding stands with Madrean trees *Juniperus coahuilensis* or *Juniperus pinchotii*). Inclusions of *Juniperus monosperma* woodland patches occur within the typical savanna matrix. *Pinus edulis* is typically absent or has low cover (<5%)..... **Southern Rocky Mountain Juniper Woodland and Savanna**
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..... **Colorado Plateau Pinyon-Juniper Woodland and Shrubland\*\***
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..... **Colorado Plateau Pinyon-Juniper Woodland and Shrubland\*\***

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- 43b. Other shrublands or shrub steppes .....44
- 44a. Upland chaparral occurs in foothills, mountain slopes and canyons in dryer habitats below the encinal (evergreen oak ) and Pinyon-Juniper woodlands (1000-2200 m elevation) in central and southern Arizona, southern and western New Mexico, southeast Nevada, and southwest Utah. Vegetation is composed of evergreen broadleaved shrubs with a moderate to dense shrub canopy; dominated by shrubs such as *Quercus turbinella*, *Arctostaphylos pungens* (and *Arctostaphylos pringlei* at higher elevations) *Cercocarpus montanus*, *Canotia holacantha*, *Ceanothus greggii*, *Forestiera pubescens* (= *Forestiera neomexicana*), *Garrya wrightii*, *Juniperus deppeana*, *Purshia stansburiana*, *Rhus ovata*, *Rhus trilobata*, or *Quercus toumeyi*, ..... **Mogollon Chaparral (45)**
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- 47a. Shrubs such as *Atriplex* spp. and/or *Krascheninnikovia lanata* dominate the moderate to dense shrub layer. Herbaceous vegetation cover is often relatively low and may include *Distichlis spicata*, *Sporobolus airoides*, or other alkali/saline tolerant grasses. Stands are typically found in basins, but may extend into plains, piedmont and foothills, depending on soils conditions .....  
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- 48b. *Chrysothamnus* spp., *Ericameria* spp., *Ephedra* spp., *Gutierrezia sarothrae*, *Krascheninnikovia lanata* and/or other shrubs and dwarf-shrubs are present forming an open shrub layer with a typically strong perennial grass understory. *Artemisia tridentata* generally absent or low cover. Stands are typically found in plains, piedmont and foothills ..... **Inter-Mountain Basins Semi-Desert Shrub Steppe**

**KEY B (Southern Rocky Mountain): Herbaceous Ecological Systems and Alliances**  
**(Perennial graminoids dominant > 20% cover with low woody cover < 10%)**

1a. Land cover is restricted to drainages, semi-riparian flats, springs or seeps.....	2
1b. Land cover is upland vegetation.....	4
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..... <b>North American Arid West Emergent Marsh***</b>	
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3b. Montane to alpine to wet meadows without a 40 cm deep organic layer.....	<b>Rocky Mountain Alpine - Montane Wet Meadow***</b>
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4b. Herbaceous cover dominated by perennial species .....	6
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6a. Herbaceous cover dominated by introduced perennial grasses and forbs (including <i>Agropyron cristatum</i> , <i>Alopecurus geniculatus</i> , <i>Agrostis stolonifera</i> , <i>Bromus inermis</i> , <i>Cenntareau sp.</i> , <i>Cirsium arvense</i> , <i>Euphorbia esula</i> , <i>Lepidium latifolium</i> , <i>Melilotus spp.</i> , <i>Thinopyrum intermedium</i> , <i>Poa pratensis</i> , <i>Phleum pratense</i> , and other introduced forage species .....	<b>Invasive Perennial Grassland and Forbland</b>
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7b. Subalpine, montane, foothill and basin vegetation.....	9
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- 12b. Lower elevation grasslands found on sandy plains, and mesas of western and southern Colorado, New Mexico, Arizona and Utah and Nevada. Vegetation is typically dominated or codominated by *Bouteloua gracilis*, *Achnatherum hymenoides*, *Pleuraphis rigida*, *P. jamesii*, *Hesperostipa comata* or other semi-arid graminoids and may include scatter shrubs, dwarf-shrubs and cacti.....  
..... **Inter-Mountain Basins Semi-Desert Grassland**