Artemisia spinescens (budsage)

Artemisia spinescens is a low-growing, suffrutescent shrub that occurs in most western states. It is found in silty, clayey, or gravelly substrates, often at the interface between sagebrush grasslands and salt desert shrub types. This low shrub is a principle spring browse plant for both domestic and native animals. Communities and habitat types have not been described for this sagebrush taxon.

Artemisia spiciformis (spiked sagebrush)

Artemisia spiciformis occurs in upper elevations in the eastern portion of the great Basin. It has been described at various taxonomic levels, recently as a subspecies of *A. tridentata* (Goodrich and others 1985) and most recently as a distinct species (Welch and others 1987). It is distinguished from other big sagebrush taxa by its large, relatively few seed heads, and the common presence of seven or more seeds per head. Average annual production often exceeds 1,500 pounds per acre (1650kg/ha). It occurs in sites similar but slightly more productive than *A. tridentata* subspecies vaseyana var. vaseyana. Due to its interchanging taxonomic status it is difficult to know which habitat types actually belong to this taxon. Major graminoides that occur with it include: *Agropyron caninum, Bromus carinatus*, and *Carex geyeri*. This taxon is believed to have originated from a crossing of *A. tridentata* subspecies *viscidula* with *A.*-var. *vaseyana*. As such, it carries a modest resprouting characteristic it gained from subspecies viscidula.

Artemisia bigelovii (Bigelow sagebrush)

Artemisia bigelovii is restricted to the very southern portions of the Great Basin. It occurs on or near rimrock areas in pinyon-juniper and mixed desert shrub communities (Welch and others 1987). Little is known of the ecology of this taxon. It resembles *A. arbuscula* except for presence of occasional ray flowers and the more sharply pointed leaf lobes.

Artemisia pygmaea (pygmy sagebrush)

Artemisia pygmaea is a very dwarf sagebrush often reaching only .5 dm tall. It occurs on peculiar edaphic situations primarily on Green River Shale (Welch and others 1987). Little is known of its specific ecology. It is a common component of sites that support rare plant species. References include Daubenmire, 1970; Hironaka et al, 1983; Tisdale, 1986; and Winward, 1980.

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TALL FORB
SRM 409

Definition, Composition, and Structure: The type is characterized by a large array of luxuriant, rather tall 16 to 48 inches (0.4 to 1.2 m) mesic forbs. In the climax condition many species are present without any species dominating (Ellison, 1954). Stands vary in number of species present and in those that are visually prominent. Certain grass and sedge species are found throughout the range of the type, but within the type, they are mostly inconspicuous and seldom comprise more than 10% of the composition. Shrubs are mostly absent. Most present day stands are in an early seral stage because of grazing disturbance or invasion of woody species, and are now dominated by a few species of seral forbs and grasses.

Major grass species found within the type include mountain bromegrass (*Bromus carinatus*), slender wheatgrass (*Agropyron trachycaulum*), oniongrass (*Melica spectabilis*), alpine timothy (*Phleum alpinum*), bluegrass (*Poa fendleriana, P. reflexa*), needlegrass (*Stipa columbiana, S. lettermanii*), and spike trisetum (*Trisetum spicatum*). Important sedges include *Carex festivella* and *C. raynoldsii*. Prominent forb species found within the type include Columbia monkshood (*Aconitum columbianum*), nettleleaf (*Agastache urticifolia*), Colorado columbine (*Aquilegia caerulea*), asters (*Aster engelmannii, A. foliaceus*), larkspur (*Delphinium barbeyi, D. occidentale*), Oregon fleabane (*Erigeron speciosus*), geranium (*Geranium richardsonii, G. viscosissimum*), stickseed (*Hackelia floribunda*), oneflower helianthella(*Helianthella uniflora*), cow parsnip (*Heracleum lanatum*), ligusticum (*Ligusticum filicinum, L. porteri*), lupine (*Lupinus alpestris, L. argenteus, L. sericeus*), bluebells (*Mertensia arizonica leonardi, M. ciliata*), western sweetroot (*Osmorhiza occidentalis*), lousewort (*Pedicularis bracteosus, P. groenlandica*), cinquefoil (*Potentilla glandulosa, P. gracilis*), western coneflower (*Rudbeckia occidentalis*), groundsel (*Senecio crassulus, S. cymbalarioides*), goldenrod (*Solidaga* spp.), meadowrue (*Thalictrum fendleri*), valerian (*Valeriana edulis, V. occidentalis*), showy goldeneye (*Viguiera multiflora*), and violet (*Viola* sp.) (Ellison, 1954; Langenheim, 1962; Ream, 1964; Gregory, n.d.; and VanHorn Ecret, 1986).

Geographic Distribution: Tall forb communities occur at elevations between 6300-9900 ft (2100 to 3300m), near springs, along streams, in small openings in forest, and in larger open parklands within Douglas-fir (*Pseudotsuga menziesii*) and spruce-fir (*Picea engelmannii-Abies lasiocarpa*) forest zones.

The type extends from the southern Wasatch range in Utah northward into Montana. It is especially prominent on the central Wasatch plateau (Ellison, 1954), on west (Horton, 1971) and east slopes of the Teton Range along

the Idaho-Wyoming border, and in the Wind River Range, Wyoming (Gregory, 1982). The type extends eastward into the Big Horn Mountains (Despain, 1973) and westward into the Centennial Mountains which are on the Idaho-Montana border (VanHorn Ecret, 1986). More southerly, the type is found in the Jarbridge Mountains along the Idaho-Nevada border (Lewis, 1975); the Ruby Mountains of Nevada (Loope, 1970; Lewis, 1971); the Uinta Mountains in Utah, and as far east as Gunnison, Colorado (Langenheim, 1962). The same and similar tall forb species occur in a seral role in the Madison (Patten, 1963) and Gallatin (Gregory, n.d.) ranges in southwestern Montana. They are also found, to a limited extent, on the non-granitic soils surrounding the central Idaho Batholith (Bill J. Little, retired USFS, 1988, personal communication; USDA-FS-R4, 1981), and possibly in the Olympic Mountains, Washington (Kuramoto and Bliss, 1970).

Ecological Relationships: The type is found on all aspects and slope gradients where soils are deep (>0.5m) and soil moisture is adequate for nearly season-long plant growth. Intensive grazing by domestic livestock causes a shift from mesic to xeric plant types. This change is accelerated where soil erosion is active. Mesic forbs and grasses are replaced by more xeric species like sticky geranium (*G. viscosissimum*), western yarrow (*Achillea millefolium*), and dandelion (*Taraxacum officinale*). During the process, there is often a pronounced increase in ephemeral species with tarweed (*Madia glomerata*) becoming prominent on many sites. On other sites, continued overgrazing or repeated site disturbance allows wyethia (*Wyethia amplexicaulis*), California falsehellebore (*Veratrum californicum*), aspen peavine (*Lathyrus lanzwertii*), or coneflower (*Rudbeckia* spp.) to become dominant.

On the Wasatch plateau, prolonged heavy grazing by cattle results in forb dominated communities, while heavy sheep use results in grass dominated communities (Ellison, 1954). Similar vegetational responses to overgrazing would be expected where ever the type occurs. With substantial soil loss, a return to the original conditions would be very slow.

Variants and Associated Species: Tall forb vegetation often extends as an understory layer into mountain big sagebrush (*Artemisia tridentata* spp.) *vaseyana* stands,) aspen (*Populus tremuloides*), and open Douglas-fir and spruce-fir forest when adjacent or near to tall forbs communities. In the Centennial Mountains, Nelson (1964) found a similar composition between tall forb types and mountain big sagebrush types, except the latter had a sagebrush overstory. However, on rocky sites, understory species in big sagebrush communities are the same as those found at lower elevations. Tall forbs are prominent as an herbaceous layer under tall shrubs (Rocky Mountain maple, *Acer glabrum; serviceberry, Amelanchier alnifolia*; chokecherry, *Prunus virginiana*) and under low density, uniformly-aged Douglas-fir (Horton, 1971).

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ALPINE RANGELAND
SRM 410

Definition, Composition, and Structure: Alpine has been defined as the zone on mountains above treeline and below permanent snowline (Oosting 1956; Box, Van Dyne, and West 1966).

Several plant communities ranging from those occurring on cliffs and dry exposed ridges to those in wet and boggy meadows are found in alpine areas (Lewis 1970; Rottman and Hartman 1987). The plant communities are often fragmented into a patchwork or myriad of small units (Briggs and MacMahon 1983; Box, Van Dyne, West 1966). Alpine floras with a few hundred species are meager compared to tropical floras where over 100,000 species are common (Billings 1969). Lewis (1970) listed about 335 taxa for the Uinta Mountains. Wind, cold temperatures, and ultra violet radiation all contribute to the harsh environment that limits the kinds and number of alpine plants. Wind is a primary factor limiting tree growth.

Alpine communities are generally dominated by low perennial sedges, grasses, and herbaceous dicots. Kobresia like sedge (*Carex elynoides*), Bellards kobresia (*Kobresia bellardii*), tufted hairgrass (*Deschampsia caespitosa*), timber oatgrass (*Danthonia intermedia*), and spike trisetum (*Trisetum spicatum*) are among the common graminoides of dry to mesic places. Water sedge (*Carex aquatilis*) is common in wetlands. Moss campion (*Silene acaulis*) and Rocky Mountain nailwort (*Paronychia sessiliflora*) are common cushion or mat plants. Alpine avens (*Geum rossii*) is a widespread, aggressive, colonizing forb. Shrubs including dwarf willows such as *Salix cascadensis* and white dryad (*Dryas octopetala*) are limited to a few species of stature equal to that of associated herbaceous plants. Low willows such as plainleaf willow (*Salix planifolia*), glaucous willow (*S. glauca*), and barrenground willow (*S. brachycarpa*) form dense willow fields about 1-4 ft (.3-1.3m) tall in places and especially at the lower limits of alpine and at treeline with krummholtz trees.

Distribution: (General North America) Alpine is found on mountains high enough to have a treeline. In the Canadian mountains, it is found as low as 6,000 ft (2000m), but its lower limit steadily increases some 360 feet (120m) per degree latitude to 30 north latitude and then declines gradually to the equator. In the central Rocky Mountains, it