

UCUT UWMEP habitat types

Shrub-steppe. This habitat is characterized by a low-moisture gradient and a plant community adapted to arid conditions. Trees are absent from the landscape and instead *Artemisia tridentata* (big sage) or *Artemisia tripartita* (threetip sage) are the dominant species throughout the region. Less common shrubs include *Purshia tridentata* (antelope bitterbrush), *Chrysothamnus viscidiflorus* (rabbit brush), *Atriplex* spp. (winter fat), and *Sarcobatus vermiculatus* (greasewood). Another important feature of shrub-steppe is an understory dominated by bunchgrasses. The most prominent species are *Pseudoroegneria spicata* (bluebunch wheatgrass), *Festuca idahoensis* (Idaho fescue), *Poa secunda* (Sandberg's bluegrass), and *Stipa comata* (needle-and-thread). With the spring rains, a colorful display of annual and perennial wildflowers blooms throughout the shrub-steppe. *Phlox speciosa* (showy phlox), *Lupinus* spp. (lupines), *Ranunculus glaberrimus* (sagebrush buttercup), *Clarkia pulchella* (ragged robin), *Calochortus macrocarpus* (sagebrush mariposa lily), *Zigadenus venenosus* (death camas), *Eriogonum* spp. (buckwheats), and *Lomatium* spp. (desert-parsley) are common. The presence of a cryptogamic crust composed of lichens, mosses, and algae is important to maintaining the integrity of shrub-steppe. This soil layer reduces wind and soil erosion, aids in nitrogen fixation, and protects against the invasion of non-native species such as *Bromus tectorum* (cheatgrass) (Washington Native Plant Society 2008).

Grassland Steppe. Grassland steppe is similar to shrub-steppe except in that *Artemisia* spp. (sagebrush) are either absent or sparsely represented, and bunchgrasses are the dominant vegetation type. This habitat type is found predominately to the east and southeast of shrub-steppe as it transitions into lowland forest in the Columbia Basin region (Crawford and Kagen). Fragmented remnants of grassland steppe are found in the Palouse region of southeastern Washington and adjacent Idaho that has largely been converted to agriculture. Two dominant bunchgrasses are *Pseudoroegneria spicata* (bluebunch wheatgrass) in drier areas and *Festuca idahoensis* (Idaho fescue) in moister ones. Other native perennial grasses can include *Festuca campestris* (rough fescue), *Aristata longiseta* (three-awn), and *Poa secunda* (Sandberg's bluegrass). In places with higher precipitation or where soils have higher moisture holding capacity, perennial and annual broadleaf forbs comprise a significant portion of the landscape (Daubenmire and Daubenmire 1970). Common wildflowers include *Balsamorhiza sagittata* (arrowhead balsamroot), *Lupinus* spp. (lupines), *Lomatium* spp. (desert-parsley), and *Eriogonum* spp. (buckwheats).

Conifer Woodland. Lowland forests throughout the region are dominated by drought-tolerant *Pinus ponderosa* (ponderosa pine). Historically these forests were adapted to a relatively frequent fire cycle that formed naturally occurring open-canopy woodlands. In modern times, fire suppression and other management techniques have led to denser stands (O'Connell 2008). Within conifer woodlands, soil type, aspect, and moisture availability will influence vegetation patterns. *Pseudotsuga menziessi* (Douglas fir) can form associations with ponderosa pine in more mesic sites. At drainage sites or riparian areas, *Populus tremuloides* (quaking aspen) will form clonal stands within the broader habitat-type. Under the right conditions, shrubs might be present as part of the understory

along with the more typical grasses and forbs. *Symphoricarpos albus* (snowberry) is the most common shrub species, with accounts of *Rosa woodsii* (Wood's rose), *Amelanchier alnifolia* (serviceberry), and *Prunus virginiana* (chokecherry) (Daubenmire 1968). Common grasses include *Calamagrostis rubescens* (pinegrass), *Festuca idahoensis* (Idaho fescue) and *Pseudoroegneria spicata* (bluebunch wheatgrass), along with *Koeleria cristata* (junegrass) and *Poa spp.* (bluegrasses). At the margins of ponderosa pine, trees are scattered and eventually give way to large expanses of savannah meadow. Here shrubs are scarce and grasses dominate the landscape. A diverse number of perennial and annual forbs also inhabit conifer woodlands and savannah meadow including *Balsamorhiza sagittata* (arrowhead balsamroot), *Dephinium nuttallianum* (Nuttall's larkspur), *Lupinus spp.* (lupines), *Achillea millefolium* (yarrow), *Lithophragma bulbifera* (bulberous fringecap), *Eriogonum heracleoides* (parsnipflower buckwheat), and *Sisyrinchium inflatum* (purple-eyed grass). Outcrops of basalt rock are also a common geologic feature of this habitat type.

Mixed Conifer. At slightly higher elevation, dry ponderosa pine woodlands begin the transition into more mixed conifer forest. Mixed conifer habitats are predominately coniferous forests with some deciduous trees present. Factors such as elevation and moisture availability play an important role in determining community composition (Cooper et al. 1991). *Pseudotsuga menziesii* (Douglas fir) is widely distributed throughout this habitat type and is the dominant tree species at lower elevations. Successional areas within Douglas fir sites may be populated with *Larix laricina* (western larch) and *Pinus contorta* (lodgepole pine). Isolated individuals of ponderosa pine might exist in drier micro-sites, with occurrences of *Abies grandis* (grand fir) and *Acer glabrum* (Rocky mountain maple) in wetter areas. As elevation and moisture availability increase, *Abies grandis* (grand fir) becomes dominant or co-dominant to Douglas fir and forms new associations with *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann's spruce), *Thuja plicata* (western red cedar), and *Pinus monticola* (western white pine). Within the mixed conifer habitat type there is great shrub diversity. The understory may exist in dense thickets with multiple strata to clearings with fewer occurrences. *Phasocarpus malvaceus* (ninebark), *Holodiscus discolor* (oceanspray), *Symphoricarpos albus* (snowberry), *Berberis repens* (creeping oregongrape), *Spiraea betulifolia* (birch-leaf spiraea), *Rosa gymnocarpa* (baldhip rose), and *Pachistima myrsinites* (mountain boxwood) are all good representatives. Less common is *Ceanothus velutinus* (shiny-leaf ceanothus). A variety of forbs that may act as indicators for this habitat-type include *Thalictrum occidentale* (meadowrue), *Arnica cordifolia* (heart-leaf arnica), *Linnaea borealis* (twinflower), *Smilacina spp.* (false Solomon's seal), *Osmorhiza chilensis* (sweet cicely), *Chimaphila umbellatum* (pipsissiwa), and *Galium spp.* (bedstraw).

Riparian Forest. Riparian forests include treed areas adjacent to streams, rivers, and lakes. Depending on elevation and topography, these forests can be dominated by deciduous or coniferous trees. For the UWMEP project, this habitat is defined as being predominantly deciduous. Dominant tree species might include *Populus trichocarpa* (black cottonwood), *Populus tremuloides* (quaking aspen), or *Alnus rubra* (red alder). Other trees that might be present are *Betula spp.* (birch), *Salix spp.* (willows), and *Rhamnus purshiana* (cascara). Riparian forests are often seasonally flooded to varying

degrees. As such, water tolerant shrubs such as *Cornus sericea* (red-osier dogwood) and *Spiraea douglasii* (Douglas's spiraea) are often associated with this habitat type. However, it is also possible that vegetation within the forested area will be composed entirely of upland species (Guard 1995). Plants identified with flooded areas include *Dryopteris austriaca* (wood fern), *Lycopus americanus* (skunk cabbage), *Myosotis laxa* (forget-me-not), *Impatiens aurella* (orange impatiens), and *Equisetum spp.* (horsetail).

Riparian Shrub. Riparian shrub habitat is found adjacent to seasonal or permanent water areas. These places are dominated by dense thickets of shrubs with either no trees present or only sparse "open-canopy" cover. Although species composition can vary due to flooding dynamics and soil type, some species are typically associated with this habitat. Taller shrubs might be *Salix spp.* (willows), *Alnus spp.* (alders), and *Crataegus douglassii* (black hawthorn). Smaller shrubs include *Spiraea douglassii* (Douglas's spiraea), *Cornus sericea* (red-osier dogwood), and *Rosa spp.* (rose). If trees are present they are fewer and of less significance, including *Populus trichocarpa* (black cottonwood) and *Populus tremuloides* (quaking aspen). The understory is variable and might include grasses, sedges, and forbs common to either Mixed Conifer or Riparian Forest habitat types depending on local conditions. This habitat type is also inclusive of areas formerly classified as "shrub scrub" in previous ISRP publications.

Wetland Meadow. Wetland Meadow habitat encompasses seasonal floodplain meadows that are wet in springtime but that typically dry by mid-summer. This habitat is dominated by a variety of *Carex spp.* (sedges) and *Juncus spp.* (rushes). *Eleocharis palustris* (creeping spikerush), *Luzula campestris* (sweep's brush), and *Juncus ensifolius* (swordleaf rush) might also be present. Grasses native to this habitat include *Calamagrostis canadensis* (blue-joint) and *Agrostis spp.* (bent-grass). On disturbed sites that have been grazed by cattle or drained for farmland, non-native pasture grasses such as *Phleum pratense* (timothy), *Alopecurus pratensis* (meadow foxtail), and *Poa pratensis* (Kentucky bluegrass) can become established (O'Connell 2008). Perennial and annual forbs are also well represented and include *Potentilla gracilis* (graceful cinquefoil), *Ranunculus spp.* (buttercup), *Lupinus polyphyllus* (bigleaf lupine), *Senecio spp.* (groundsel), *Triteleia hyacinthina* (hyacinth brodiaea), *Castilleja spp.* (paintbrush), and *Camassia quamash* (blue camas).

Emergent Wetland. Emergent wetland marshes retain sufficient standing or soil water to support the dominant species *Typha latifolia* (cattail), as well as other obligate and facultative wetland species. The dominant cattails might occur in pure stands or in mosaics with *Scirpus tabernaemontani* (soft-stem bulrush). Also common are *Sparaganium eurycarpum* (giant bur-reed), *Eleocharis spp.* (spikerush), *Polygonum spp.* (smartweeds), and several types of *Carex spp.* (sedge). Aquatic open water areas in the center of the cattail marsh support a number of floating plants such as *Lemna minor* (common duckweed), *Spirodela polyrhiza* (greater duckweed), and *Nuphar lutea* (yellow pond lily). The introduced grass *Phalaris arundinacea* (reed canary grass) is also widespread. At the margins of emergent wetlands, perennial and annual facultative wetland species can be found among the sedges and rushes. These include *Scutellaria*

galericulata (marsh skullcap), *Mentha arvensis* (field mint), *Lysichiton americanus* (water whorehound), and *Stachys rigida* (rigid hedge-nettle).