

# Field Keys to Groups and Alliances in the National Vegetation Classification: Northern Basin & Range / Columbia Plateau Ecoregions



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*Northwest Great Plains Mixedgrass Prairie, Dakota Prairie National Grasslands, North Dakota.*  
*Western juniper woodland, BLM Black Hills Recreation Area, Oregon.*

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See appendix document: [Descriptions\\_NVC\\_Groups\\_Alliances\\_NorthernBasinRange\\_Nov\\_2017.pdf](#)

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## Introduction and Background

BLM manages extensive lands that support a variety of vegetation types that have been classified and mapped on multiple scales to facilitate resource planning, decision making, and natural resource management. On the ground land managers and biologists need to be able to independently classify these habitats to US National Vegetation Classification (NVC) vegetation types to assess the accuracy of these maps and directly label new AIM vegetation transects while in the field. These new labeled transects can be used to improve the map accuracy, assess ecological condition (ruderal vs natural or semi-natural vegetation), assess fuel loads/fire risk, and target habitats for species of concern for species management.

Field keys to vegetation types are an important tool for managers to label vegetation. Dichotomous keys allow field personnel to systematically step through options and arrive at a label for a given geographic area. Field key results are linked to descriptions of each type, which can help confirm result and provide information on range of type, species composition, environmental factors, and ecological processes such as fire, and other information that will assist in resource management and vegetation restoration.

## Purpose and Objectives

Across the West, BLM managers are implementing Secretarial Order 3336, to apply new strategies appropriate to conservation and management of sagebrush ecosystems and sage-grouse habitat. The sage-grouse habitat assessment framework (Stiver et al. 2015) and the BLMs Assessment, Inventory and Monitoring strategy (MacKinnon et al. 2011, Toevs et al. 2011, Herrick et al. 2015) have field data collection as components during which a land cover type “label” can be applied to the area being sampled.

Having keys to units in the National Vegetation Classification (NVC; FGDC 2008) for use in the field would provide tools for achieving consistent application of NVC type names to these field samples. Accurately labeled on-the-ground vegetation samples are extremely valuable for a number of applications, e.g. monitoring of rangeland condition by vegetation type, training sites for mapping, inventory of vegetation types found in a management area and identifying particular habitats for species of concern (Reid et al. 2016).

NatureServe ecologists have developed keys for use in the field to the NVC Macrogroups, Groups, and Alliances found in 4 clusters of EPA ecoregions (**Figure 1**): a) Central Basin and Range, b) Northern Great Basin and Range / Columbia Basin, c) Wyoming Basin, and d) Northwestern and Western Great Plains / High Plains (northern portion) (EPA 2013, Omernik 1987).

The keys include the vegetation types most relevant to the BLM, such as sagebrush, pinyon-juniper, semi-desert scrub (e.g. blackbrush, salt desert scrub), lower elevation grasslands, and riparian and wet meadow types. Generally, higher elevation forests and alpine vegetation types were not included, unless of particular interest in one ecoregion (e.g. aspen in the Central Basin and Range) or to clarify contrasting vegetation units.

## Project Overview

NatureServe ecologists are well prepared to write field keys such as these. For the original LANDFIRE effort, we developed field keys to ecological systems, organized into clusters of map zones (roughly corresponding to ecoregions). NatureServe is a partner with the National Park Service’s Vegetation Inventory Program, and has written keys over recent decades for many national park vegetation inventory efforts in the western U.S. (e.g. Cogan et al. 2012, Kearsley et al. 2015), many of them organized by NVC alliances. NatureServe ecologists developed the procedures for assigning of expert labels to plots, in coordination with the LANDFIRE, FIA, USGS and TNC partners. In partnership with LANDFIRE NatureServe staff recently developed keys to automate the labeling of some 400,000 plots in CONUS to NVC Groups (Reid et al. 2014).

The writing of field keys includes the following major tasks:

- 1) Determine list of NVC Groups and Alliances found in the geography selected for the field key.
- 2) Compile and review previously written keys for related vegetation (e.g. keys to ecological systems, NPS park units).
- 3) Review concepts (e.g. descriptions) and criteria used in the LANDFIRE auto-keys to NVC Groups
- 4) Write the keys to selected NVC Macrogroups, Groups, and Alliances
- 5) Have someone who did not write the keys conduct a thorough review of the keys
- 6) Revise keys as necessary



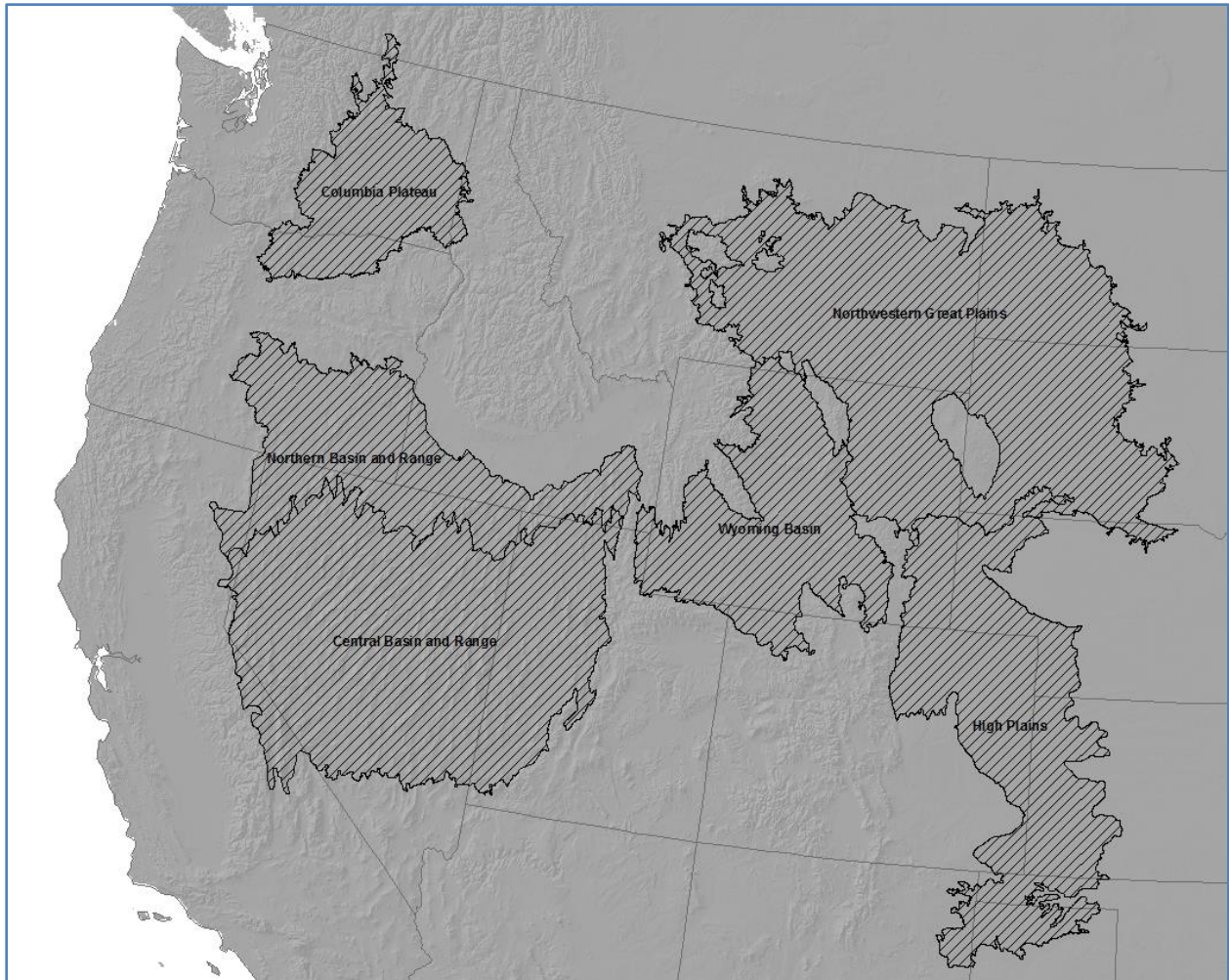


Figure 1. EPA Ecoregions used to organize field keys to the Groups and Alliances of the National Vegetation Classification (NVC) that are found in these ecoregions. NVC types found in the Northern Basin and Range and Columbia Plateau ecoregions were combined into one key. Types found in the northern portion of the High Plains ecoregion were included in the Northwestern Great Plains key.

## List of Products

- 1) Project summary report (this document)
- 2) Field keys NVC Groups and Alliances found in 4 clusters of EPA ecoregions including:
  - a. Central Basin and Range
  - b. Northern Basin and Range / Columbia Plateau
  - c. Wyoming Basin
  - d. Northwestern Great Plains / High Plains (northern portion)
- 3) Descriptions of NVC Divisions, Macrogroups, Groups and Alliances reported to occur in each EPA ecoregion (Appendices to each ecoregional key; see appendix document [Descriptions\\_NVC\\_Groups\\_Alliances\\_NorthernBasinRange\\_Nov\\_2017.pdf](#)).

Each ecoregion-based key is a separate document, with the same introductory material (this report & key instructions), but the key itself is different for each ecoregion. Four appendices are provided, one for each ecoregion key, containing the descriptions of the NVC Groups and Alliances included in the relevant ecoregional key.

There is a Table of Contents included for each key, so the user can easily navigate the key itself; and each description appendix also has a Table of Contents to ease finding a description of interest to the key user.

## Field Key Design and Instructions for Use

Below we provide information about the NVC hierarchy (an overview), how the keys are organized, definitions for some of the terms used in the keys, and general instructions for how to use them. **We advise the user to read the below sections before attempting to use the keys.**

These field keys are dichotomous and organized using the US National Vegetation Classification (NVC) hierarchy levels for each geographic area. Dichotomous keys are tools that have commonly been used for identifying plants and animals, but can be applied to identifying other things with complex relationships such as vegetation types. “Dichotomous” means the key is organized in a series of pairwise choices of distinguishing characteristics that leads the user to the next pair of choices, or to a conclusion. These pairwise choices are also called *couplets*. Once a vegetation area is keyed, the resulting type name can be cross-checked against a vegetation description to confirm the label for the vegetation type.

### NVC Hierarchy

The NVC hierarchy is organized in a strict hierarchical fashion, from broad to finer units in eight, completely nested levels from Class to Association (**Figure 2**). These keys use four of the eight hierarchical levels of the NVC: Division, Macrogroup, Group and Alliance. The mid-levels (Division, Macrogroup, and Group) are based on combinations of diagnostic and dominant plant growth forms, continental to regional differences in mesoclimate, geology, substrates, hydrology and disturbance regimes, and a broad to somewhat narrow set of diagnostic species that represent regional biogeographic differences (**Table 1**). The lower levels (Alliance) are based primarily on floristics, including a narrow range of characteristic species, diagnostic species, and some sub-regional environmental factors (Faber-Langendoen et al. 2007, FGDC 2008, Faber-Langendoen et al. 2014; see [www.usnvc.org](http://www.usnvc.org) to explore the full hierarchy and access descriptions of units).

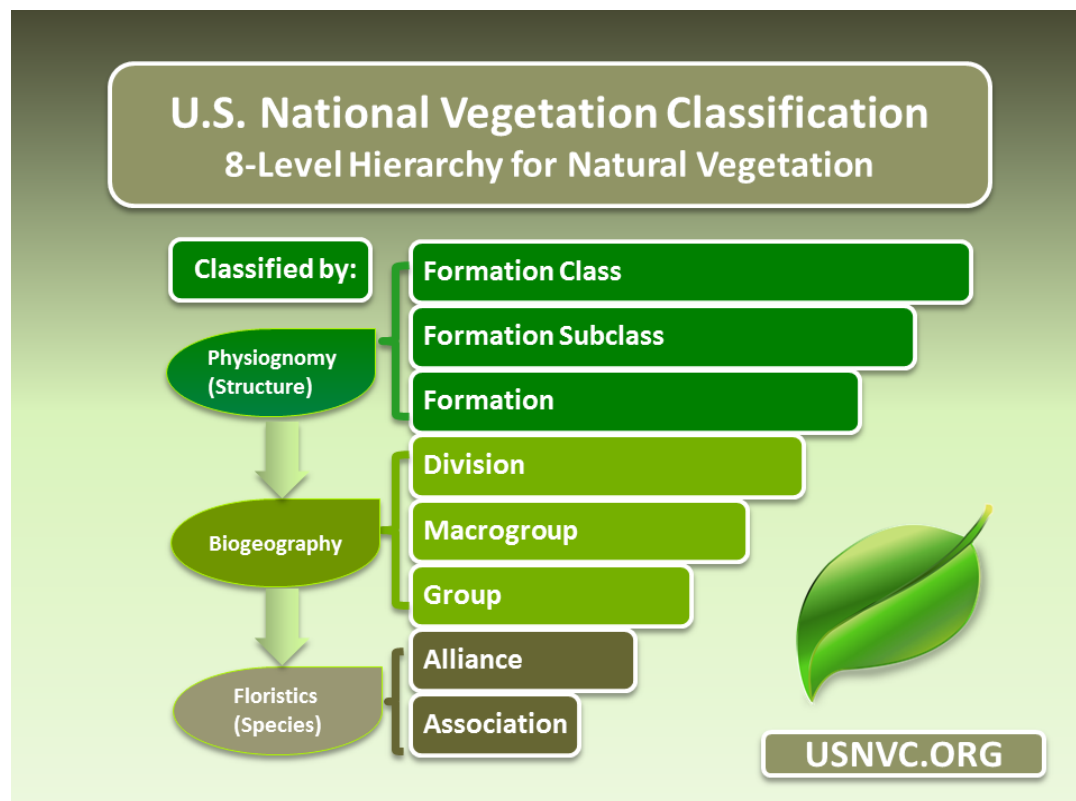


Figure 2. Summary of the primary criteria used to define the various levels of the USNVC.

### Natural, Ruderal and Cultural Vegetation

One of the more distinctive features of the USNVC is that it includes both natural vegetation, which establishes spontaneously and is shaped partly or strongly by ecological processes, and cultural vegetation, which is typically planted and strongly shaped by anthropogenic processes, e.g., corn fields or golf courses). By including all vegetation types in a consistent framework, land managers and others can address issues such as wildfire regimes, pest infestations, exotic species invasions, successional changes, and conversion to farms or homes. In addition, the comprehensive approach of the USNVC classification enables an ‘all lands approach,’ which several government agencies use to ensure that their agency-specific land management planning takes place in the context of the larger landscape.

**Natural vegetation** is composed predominantly of spontaneously growing sets of plant species with composition shaped by both abiotic (site) and biotic processes; these are vegetation types whose species composition is primarily determined by non-human ecological processes (Küchler 1969, Westhoff and van der Maarel 1973, van der Maarel 2005). Although natural vegetation is variously affected by human activities (e.g., logging, livestock grazing, fire, introduced pathogens), it retains a distinctive set of spontaneous vegetation and ecological characteristics (Westhoff and van der Maarel 1973, Di Gregorio and Jansen 1996). It includes both near-natural and ruderal vegetation (see below).

**Natural vegetation types are included in the keys provided here.**

**Ruderal vegetation** includes the more distinctive invasive and weedy vegetation types; that is, those with no apparent historical natural analogs, sometimes referred to as “novel” or “emerging” ecosystems (Hobbs et al. 2006, Belnap et al. 2012). Within the NVC this vegetation is referred to as ruderal; that is “vegetation found on human-disturbed sites, with no apparent recent historical natural analogs, and whose current composition and structure (1) is not a function of continuous cultivation by humans and (2) includes a broadly distinctive characteristic species combination, whether tree, shrub or herb dominated. The vegetation is often comprised of invasive species, whether exotic or native, that have expanded in extent and abundance due to human disturbances” (Curtis 1959, Ellenberg 1988, Lincoln et al. 1998). **Ruderal vegetation types are included in the keys provided here.**

### Cultural Vegetation Hierarchy

The **Cultural vegetation hierarchy** is organized by type of human manipulation at the top four, broadest levels, including distinctions between agricultural lands, reclaimed farmlands, and urban lawns and parks. The two mid-levels are defined by climate, plant taxa, and specifics of human manipulations, such as temperate row crops and hayfields or tropical orchards. The lowest two levels are defined by the most common species and appearance, describing sweet corn or banana crops, for example. Definitions and examples of the cultural hierarchy are provided in FGDC (2008) and Faber-Langendoen et al. (2014).

**Cultural vegetation types are not included in the keys provided here.**

Table 1. Levels, definition and example of the hierarchy for natural vegetation. The name of the level can be added to the type name for clarity, where needed.

Natural Hierarchy		Definition	Example
Upper	L1 – Formation Class	A vegetation type defined by broad combinations of dominant general growth forms adapted to basic moisture, temperature, and/or substrate or aquatic conditions.	<b>Colloquial Name:</b> Desert & Semi-Desert  <b>Scientific Name:</b> Xeromorphic Woodland, Scrub & Herb Vegetation <b>Code:</b> 3.
	L2 – Formation Subclass	A vegetation type defined by a combination of general dominant and diagnostic growth forms that reflect global mega- or macroclimatic factors driven primarily by latitude and continental position, or that reflect overriding substrate or aquatic conditions.	<b>Colloquial Name:</b> Cool Semi-Desert Scrub & Grassland  <b>Scientific Name:</b> Cool Semi-Desert Scrub & Grassland <b>Code:</b> 3.B.
	L3 – Formation	A vegetation type defined by combinations of dominant and diagnostic growth forms that reflect global macroclimatic conditions as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions.	<b>Colloquial Name:</b> Cool Semi-Desert Scrub & Grassland  <b>Scientific Name:</b> Cool Semi-Desert Scrub & Grassland <b>Code:</b> 3.B.1.
Mid	L4 – Division	A vegetation type defined by combinations of dominant and diagnostic growth forms and a broad set of diagnostic plant species that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes.	<b>Colloquial Name:</b> Western North American Cool Semi-Desert Scrub & Grassland  <b>Scientific Name:</b> <i>Artemisia tridentata</i> - <i>Atriplex confertifolia</i> / <i>Hesperostipa comata</i> Cool Semi-Desert Scrub & Grassland <b>Code:</b> D040

Natural Hierarchy		Definition	Example
	L5 – Macrogroup	A vegetation type defined by moderate sets of diagnostic plant species and diagnostic growth forms that reflect biogeographic difference in composition and sub-continental to regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.	<p><b>Colloquial Name:</b> Great Basin-Intermountain Tall Sagebrush Steppe &amp; Shrubland</p> <p><b>Scientific Name:</b> <i>Artemisia tridentata</i> - <i>Artemisia tripartita</i> ssp. <i>tripartita</i> - <i>Purshia tridentata</i> Steppe &amp; Shrubland <b>Code:</b> M169</p>
	L6 – Group	A vegetation type defined by a relatively narrow set of diagnostic plant species (including dominants and co-dominants), broadly similar composition, and diagnostic growth forms that reflect regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.	<p><b>Colloquial Name:</b> Intermountain Dry Tall Sagebrush Steppe &amp; Shrubland</p> <p><b>Scientific Name:</b> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> - <i>Artemisia tridentata</i> ssp. <i>tridentata</i> Steppe &amp; Shrubland <b>Code:</b> G303</p>
Lower	L7 – Alliance	A vegetation type defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation. Alliances reflect regional to subregional climate, substrates, hydrology, moisture/nutrient factors, and disturbance regimes.	<p><b>Colloquial Name:</b> Wyoming Big Sagebrush Dry Shrubland</p> <p><b>Scientific Name:</b> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> Dry Steppe &amp; Shrubland <b>Code:</b> A3184</p>
	L8 – Association	A vegetation type defined by a characteristic range of species composition, diagnostic species occurrence, habitat conditions and physiognomy. Associations reflect subregional to local topo-edaphic factors of substrates, hydrology, disturbance regimes and climate.	<p><b>Colloquial Name:</b> Wyoming Big Sagebrush / Indian Ricegrass Shrubland</p> <p><b>Scientific Name:</b> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> / <i>Achnatherum hymenoides</i> Shrubland <b>Code:</b> CEGL001046</p>



## Use in Field

The key is designed to assist users in identifying Division, Macrogroup, Group and Alliance level units in the field. The NVC vegetation unit concepts are robust, but still constructed from available field data so may not account for all types occurring within the sample area, nor explain the full range of variation of all vegetation types as they appear on the ground.

For each geographic area there is a field key to each the NVC units occurring in that Division in that area. Knowing the Division, the user can choose one of two keys to lower level units; one for upland divisions and one for riparian or wetland divisions. These secondary keys are to Macrogroup, Group and Alliance within a given Division. First vegetation is keyed to NVC Division, then depending on the division, one keys further in either the upland or the riparian and wetland key to determine Macrogroup, Group and Alliance units.

In time, field crews will be able to identify vegetation to Division without the Division Key and will be able to go directly to the appropriate secondary key. Indeed, many users will be able to go directly to the Macrogroup or Group section of the key, once familiar with the hierarchical structure of the keys and the vegetation within a region.

The Key to NVC Divisions is defined by the physiognomy of the vegetation, i.e., Forest/ Woodland, Shrubland/Shrub Steppe (shrub herbaceous), Herbaceous (graminoid or forb dominated) and Sparse vegetation. The second level (Macrogroup, Group and Alliance) focuses on the dominant and diagnostic species' canopy cover and to a lesser extent, habitat or elevation zone. Also important are geographic range of occurrence and specific environmental variables such as a sandy substrates for sand deposit vegetation types.

### **For use in the field there are several assumptions regarding use of keys:**

- 1) The area being keyed is a homogeneous section of vegetation. Be aware that transects may sample ecotones or may cross from one type of vegetation into another. When a transect crosses a boundary, it may need to be keyed for each homogeneous section within the transect. Transects sampling transitional vegetation in ecotones is problematic as it may not key or key to multiple vegetation types.
- 2) Percent cover in the key refers to absolute canopy cover, not foliar cover and not relative cover, unless specified in key couplet.
- 3) Once you have made your selection of a vegetation type based on the key, always read the description; if it appears to be a poor fit, make a note of it and flag the data sheet for further expert review.

## Use in the office

Plot data has the same assumptions and limitations of using a key in the field; this key assumes the unit being keyed is homogenous. It may not be possible to separate out homogenous sections if transects cross into a second type of vegetation. Also the landscape context is lost so without notes from field crews, it is difficult to determine if sampled vegetation has been disturbed or otherwise altered so that it does not represent the natural conditions, or if the vegetation is transitional (ecotonal) without a clear difference between two adjacent vegetation types.

## Key Instructions

These dichotomous keys are organized by the hierarchical units of the US National Vegetation Classification (NVC) Units. Keying is done in a two-step process starting with the broader Key to Divisions, then moving to separate keys to other mid-level units (Macrogroup and Group) and the lower level unit (Alliance). The Key to Divisions will result in a division level unit such as D040 Western North American Cool Semi-Desert Scrub & Grassland. Then the user goes to the Table of Contents to find the desired key for that division. Division keys will key vegetation in a nested fashion to the Macrogroups, Groups and Alliances that occur within the geographic area of the key.

These Division Keys are organized in the Table of Contents hierarchically in two groups:

- A) Keys to USNVC Upland Macrogroups, Groups and Alliances in the Central Basin and Range Ecoregion in the Western US and
- B) Key to USNVC Wetland and Riparian Macrogroups, Groups and Alliances in the Central Basin and Range Ecoregion in the Western US.

Numbering in these keys is organized by the NVC hierarchy. Couplets are paired 1a and 1b, to be read as 1a criteria versus 1b criteria. The key is completely nested and starts with the macrogroup couplets, which are numbered as “M”; e.g. M1a, M1b, M2a, M2b, etc.), then group couplets (numbered “G”; e.g. G1a, G1b, G2a, G2b, etc.) and finally alliance couplets (numbered “A”; e.g. A1a, A1b, A2a, A2b, etc.). The Key to Divisions is numbered similarly with “D” for each couplet: e.g. D1a, D1b, D2a, D2b, etc.).

In some cases, there are couplets for additional Macrogroups, Groups and Alliances that are not known from the specific ecoregion but have been included for reference purposes to contrast with the corresponding types. These NVC units are noted with an “\*” at the end of the name of the unit.

When using this strictly nested key, if you come to a dead end or to alliances that do not represent the vegetation you are keying, it is important to verify that you correctly keyed to Division, Macrogroup and Group levels. The upper levels of the hierarchy are biogeographically influenced so vegetation dominated by similar, widespread species can occur in multiple alliances. For example, *Artemisia tridentata* (big sagebrush) occurs in multiple alliances as do widespread grasses such as *Pseudoroegneria spicata* (bluebunch wheatgrass). Also, some of the widespread Alliances were placed in Groups as a “best fit” regionally and it is possible to have “outliers” from adjacent regions e.g., Mojave Mid-Elevation Mixed Desert Scrub Group in the southern Great Basin. Therefore, it is essential to verify your initial results from the key by trying alternative similar couplets in the upper levels of the hierarchy.

In addition to the key, you will be provided full descriptions of vegetation units at the Division, Macrogroup, Group and Alliance levels. Please read the description of units to verify your key result is correct. Some NVC units are somewhat heterogeneous and may include vegetation that differs from a generalized concept, but these are often clearly addressed in the descriptions. Not all species that distinguish each Group or Alliance could be listed in the couplets; the descriptions are much more complete.

**Definitions for use in keys (see Faber-Langendoen et al. 2016 for an extensive list of growth-form terms):**

#### **Definitions of Terms used in Key to NVC Divisions**

**Cryomorphic** — Pertaining to plants having structural or functional adaptations to survive cold temperatures and resist frost damage (e.g., alpine creeping dwarfshrubs, krummholz).

**Cryptogam** — A plant that produces by spores or gametes rather than seed, i.e. an alga, bryophyte or pteridophyte (fern). For vegetation purposes, often extended to include lichen, which are comprised of a fungus and an alga. Often a component of biological soil crust.

**Hydromorphic** — Pertaining to plants having structural or functional adaptations for living in water-dominated or aquatic habitats (adapted from FGDC 1997 and Lincoln and others 1998).

**Lithomorphic** — Pertaining to plants, especially cryptogams, having structural or functional adaptations for living on rock surfaces or in rocky substrates (i.e. particle sizes larger than 2 mm diameter) or very hard surfaces, such as dense clay badlands (adapted from Lincoln and others 1998).

**Mesomorphic** — Pertaining to plants requiring environmental conditions of moderate moisture and temperature or which are only partially protected against desiccation (adapted from Lincoln and others 1998).

**Scleromorphic**— Pertaining to plants that have hard leaves, short internodes and leaf orientation parallel or oblique to direct sunlight.

**Xeromorphic** — Pertaining to plants having structural or functional adaptations to prevent water loss by evaporation (Lincoln and others 1998). Xeromorphic growth forms include succulent (e.g., cacti, euphorbias) and small-leaved shrubs and trees.

Examples:

- Mesomorphic Tree Vegetation (Forest & Woodland)
- Mesomorphic Shrub & Herb Vegetation (Shrub & Herb Vegetation)
- Xeromorphic Woodland, Scrub & Herb Vegetation (Desert & Semi-Desert)
- Hydromorphic Vegetation (Aquatic Vegetation)

## Definitions of Terms used in Keys to NVC Macrogroups, Groups, and Alliances

**Tree** - A woody plant that generally has a single main stem and a more or less definite crown. In instances where growth form cannot be readily determined, woody plants equal to or greater than 5 m in height at maturity are to be considered trees (adapted from FGDC 1997). Excludes krummholz (wind-stunted trees), but includes small trees or “treelets” (Box 1981). Tall multi-stemmed woody plants with strong canopy structure and that will exceed 5 m would be included here (e.g. mature, multi-stemmed *Juniperus osteosperma*, *Cercocarpus ledifolia* in the United States). Also includes Cactaceae, *Carnegia gigantea* (saguaro), Agavaceae, *Yucca brevifolia* (Joshua trees), and other species over 5 meters in height at maturity.

**Shrub** - A woody plant that generally has several erect, spreading, or prostrate stems that give it a bushy appearance. In instances where growth form cannot be readily determined, woody plants less than 5 m in height at maturity are to be considered shrubs (adapted from FGDC 1997). Includes krummholz (wind-stunted trees), but excludes small trees (Box 1981). Includes dwarf-shrubs (less than 30 cm), low or short woody vines, and arborescents (woody plants that branch at or near ground-level but grow to low tree heights) (Box 1981). Includes cacti less than 5 meters in height at maturity. Includes both the “Typical Stem succulents” and “Bush succulents” (Box 1981), *Agave* and *Yucca*. Some multi-stemmed, bushy woody species (“scrub”) that reach up to 10 m may be included here, such as *Quercus gambelii* (Gambel oak) or riparian scrub *Alnus incana* (gray alder) and *Alnus viridis* (green alder).

**Herb** - A vascular, non-woody plant without perennial aboveground woody stems, with perennating buds borne at or below the ground surface. (Whittaker 1975, FGDC 1997). Includes forbs (both flowering forbs and spore-bearing vascular plants), graminoids, and herbaceous vines.

**Nonvascular** - A plant or plant-like organism without specialized water or fluid conductive tissue (xylem and phloem). Includes mosses, liverworts, hornworts, lichens, and algae (adapted from FGDC 1997). Also called thallophytes or “nonvascular cryptogams,” (that is, excluding the vascular cryptogams; see Herb) (Box 1981).

**Epiphyte** - A vascular or nonvascular plant that grows by germinating and rooting on other plants or other perched structures, and does not root in the ground (adapted from FGDC 1997).

**Liana** - A woody, climbing plant that begins life as terrestrial seedlings but relies on external structural support for height growth during some part of its life (Gerwing 2004), typically exceeding 5 m in height or length at maturity. Non-woody climbers are treated as “Herb.”

### Other tips for using field keys.

1. If area of interest is in a transition zone between wetland and upland, try keying as both upland and wetland/riparian sections of the key. In general Upland Vegetation is influenced only by precipitation, whereas vegetation of wetlands, riparian areas, playas, and/or mudflats is influenced by accumulated runoff, groundwater, impounded water, seasonal flooding, or any source of moisture in addition to precipitation.
2. You are observing vegetation that you think is an herbaceous or shrubland community, but it has some tree cover. In this case, try keying the vegetation through the woodland key as well as the herbaceous or shrubland key. In general with any layer, if it does not cover at least 8% (tree layer) or 5% (shrub or herbaceous layers), it is ignored. The exception is in very sparse communities (see #5 below).
3. The diagnostic layer consists of woody plants that may appear in either a shrub or a tree form, depending on site conditions and age. These species include *Pinus monophylla*, *Juniperus osteosperma*, and *Cercocarpus ledifolius*. In this key, these species are considered to be evergreen trees, regardless of their height or growth form. For example *Cercocarpus ledifolius* Scrub Alliance is keyed in a woodland division: D010 Western North American Pinyon - Juniper Woodland & Scrub
4. Big sagebrush (*Artemisia tridentata*) needs to be identified to subspecies because different subspecies are characteristic of different Groups. For example *Artemisia tridentata* ssp. *vaseyana* is diagnostic of Intermountain Mountain Big Sagebrush Steppe & Shrubland (G304) that occurs at montane and subalpine elevations. In general, subspecies of other *Artemisia* taxa are also necessary to correctly key to Alliance (e.g. subspecies of *A. arbuscula* and *A. cana*).
5. Sparsely vegetated communities are defined as having total vascular plant cover of 2-10% (sometimes a little more given the range of natural variation) and are often a mix of woody and herbaceous plants with nothing dominant or diagnostic. In some stands cover of non-vascular organisms such as lichen and moss may actually dominate these communities. Sparsely vegetated areas are typically heterogeneous and can be difficult to key. Borderline “sparsely” vegetated stands should always be run through multiple keys because even though they may not fall clearly into a woodland, shrubland or herbaceous category, they may actually be non-sparse communities (e.g.

the natural variation of some of the non-sparse vegetation types approaches 10% total vascular plant cover and may range below). This is especially true for shrubland and dwarf-shrubland associations that occur in harsh habitats such as deserts or alpine areas. Go by dominance rather than absolute cover measurements.

6. Mixed evergreen – deciduous (aspen) forests and woodlands generally have 25-75% relative tree canopy cover of both conifers and aspen. Aspen stands generally have <25% relative tree canopy cover of conifer trees and conifer stands have <25% relative tree canopy cover of aspen. Be sure to consider the full Minimum Mapping Unit (MMU) observation area in case the point lands near a small patch inclusion.
7. Focus on the perennial species in the community unless the community or layer consists almost entirely of annuals or ephemerals or is highly disturbed or degraded.
8. The NVC does not weight all species as contributing equally to a classification. Species vary in their degree of habitat specialization. To a point, the more specialized and constant a species (high fidelity), the more it is likely to be a "diagnostic" species that controls the assignment of a community to an association. Generalist species such as *Ephedra viridis*, *Ericameria nauseosa*, *Gutierrezia sarothrae*, *Poa secunda*, *Opuntia* spp. are only considered diagnostic if they are overwhelmingly dominant. For example, if you are in a pinyon - juniper woodland with about equal cover of *Cercocarpus ledifolius* and *Artemisia tridentata*, it will be classified as *Pinus monophylla* - *Juniperus osteosperma* / *Cercocarpus ledifolius* Woodland, not *Pinus monophylla* - *Juniperus osteosperma* / *Artemisia tridentata* Woodland. Weak indicator species generally are not used to classify unless strongly dominant.

Some examples of such diagnostic considerations from the interior western US include:

**Subalpine trees:** *Pinus longaeva* > *Picea engelmannii* > *Pinus flexilis* > *Populus tremuloides*

**Montane trees:** *Pinus ponderosa* > *Abies concolor* > *Pseudotsuga menziesii* > *Populus tremuloides*, although this will differ among seral stands versus persistent stands.

**Rock outcrop shrubs:** *Cercocarpus ledifolius* > *Cercocarpus intricatus* > *Peraphyllum ramosissimum*, *Glossopetalon spinescens* > *Artemisia tridentata* > *Ephedra viridis*

**Upland shrubs:** *Artemisia arbuscula*, *Artemisia nova* > *Artemisia tridentata* ssp. *vaseyana* > *A. t.* ssp. *tridentata* > *Amelanchier utahensis* > *Purshia tridentata* > *Symphoricarpos oreophilus*

**Shrub in alluvial fans, alluvial flats and terraces:** *Sarcobatus vermiculatus* > *Artemisia tridentata* ssp. *tridentata* > *A. t.* ssp. *wyomingensis* > *Ericameria nauseosa*

**Grasses, Strong indicators:** *Leymus cinereus*, *Elymus trachycaulus*, *Pseudoroegneria spicata*, *Achnatherum lettermanii*, *Hesperostipa comata*, **Medium:** *Pleuraphis jamesii*, *Achnatherum hymenoides*, *Poa fendleriana*. **Weak:** *Poa secunda*, *Elymus elymoides*, *Aristida* spp., *Sporobolus cryptandrus*, *Bromus inermis*, *Poa pratensis*, *Bromus tectorum*.

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# Keys to USNVC Divisions, Macrogroups, Groups and Alliances in the Northern Basins and Range and Columbia Plateau Ecoregions

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\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

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## Introduction

This is a field key of eight upland and six wetland/riparian divisions from the Northern Basin and Range and Columbia Plateau ecoregions.

NatureServe ecologists have developed keys for use in the field to the NVC Macrogroups, Groups, and Alliances found in 4 clusters of US EPA ecoregions: the Central Basin and Range, the Northern Basin and Range and the Columbia Plateau, the Wyoming Basin, and the Northwestern Great Plains and the High Plains (northern portion).

These field keys are dichotomous and organized using the National Vegetation Classification (NVC) hierarchy levels for each geographic area. Dichotomous keys are tools that have commonly been used to identify plants and animals, but can be applied to identifying other things with complex relationships such as vegetation types. Dichotomous means the key is organized in series of steps, each with two choices of distinguishing characteristics that leads to a conclusion.

The NVC hierarchy is organized in hierarchical fashion, from broad to finer units in eight, completely nested, levels from Class to Association. These keys use four of the eight hierarchical levels of the NVC: Division, Macrogroup, Group and Alliance. The mid levels (Division, Macrogroup, and Group) are based on combinations of diagnostic and dominant growth forms, continental to regional differences in mesoclimate, geology, substrates, hydrology and disturbance regimes, and a broad to somewhat narrow set of diagnostic species that represent regional biogeographic differences. The lower levels (Alliance) are based primarily on floristics, including a narrow range of characteristic species, diagnostic species, and some subregional environmental factors (Faber-langendoen et al. 2007, FGDC 2008).

The keys include the vegetation types most relevant to the BLM, such as sagebrush, pinyon-juniper, semi-desert scrub (e.g. blackbrush, salt desert scrub), lower elevation grasslands, and riparian and wet meadow types. Generally, higher elevation forests and alpine vegetation types are not included, unless of particular interest in one ecoregion (e.g. aspen in the Central Great Basin) or to clarify contrasting vegetation units.

The keys are designed to assist users in identifying Division, Macrogroup, Group and Alliance level units in the field. The NVC vegetation unit concepts are robust, but still constructed from available field data and what is currently known about distribution, so may not account for all types occurring within the sample area, nor explain the full range of variation of all vegetation types as they appear on the ground.

The key has two levels; the first level Division Key is defined by the physiognomy of the vegetation, i.e., Forest/ Woodland, Shrubland/Shrub Steppe (shrub herbaceous), Herbaceous (graminoid or forb dominated) and Sparse vegetation. The Division Key determines appropriate Division. The second level (Upland and Wetland/Riparian key) focuses on the dominant and diagnostic species' canopy cover and to a lesser extent, habitat or elevation zone, and provides the keys to Macrogroups, Groups and Alliances within the Division. Also important are geographic range of occurrence and specific environmental variables such as a sandy substrates for sand deposit vegetation types. Once the user has keyed to a Division, then the Table of Contents is used to link to that Division within a portion of the Upland or Wetland/riparian key.

For more information about the structure and content of the keys, how to use them, and definitions of some terms used in the keys, see the report accompanying this key (above, in section **Field Key Design and Instructions for Use**).



## Key to USNVC Divisions in the Western US

*The division key includes all divisions found in the western U.S.; one or more of the divisions may not occur in the region represented in the main body of the keys; these are indicated by an \* after the name of the division.*

- D1a.** Vegetation of rocky or rock-like habitats, including outcrops, cliffs, talus, or scree. Cryptogam vegetation tends to dominate, with vascular plant species of low cover (less than 10%). .....**D2**
- D1b.** Vascular vegetation present with 10% or greater cover and not like above in all respects.....**D3**
- D2a.** Vegetation of rocky or rock-like habitats, including outcrops, cliffs, talus, or scree, in low- to mid-elevation, temperate and boreal climatic areas of western North America generally west of the 100<sup>th</sup> Meridian. Cryptogam vegetation tends to dominate, with vascular plants species of low cover.....  
.....**D052 Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation**
- D2b.** Vegetation of eastern and boreal North America generally east of the 100<sup>th</sup> Meridian found on somewhat to strongly vertical cliffs, talus slopes, and erosional bluffs and characterized by sparse and patchy vascular vegetation and often high nonvascular and fern cover (does not occur in CBR)....  
.....**D051 Eastern North American Temperate & Boreal Cliff, Scree & Rock Vegetation \***
- D3a.** Tree-dominated vegetation of tropical, temperate and boreal regions, characterized by broadly mesomorphic (including scleromorphic) tree growth forms, including broad-leaved, needle-leaved, sclerophyllous, palm, bamboo trees, and tree ferns, with at least 10 percent cover. Includes humid to seasonally dry tropical to boreal and subalpine climates; wet to dry substrate conditions. Includes native, managed and some plantation forests where human management is infrequent. ....**D5**
- D3b.** Vegetation not like above in all respects .....**D4**
- D4a.** Grasslands, shrublands, open tree savannas, marshes, bogs, and fens dominated by broadly mesomorphic (including scleromorphic) shrub and herb growth forms (including broad-leaved, needle-leaved, and sclerophyllous shrubs, and forb and graminoid herbs), typically with <10% mesomorphic tree cover (but see discussion of tropical grasslands and savannas above), tropical to boreal and subalpine climates, wet to dry substrate conditions. ....**D12**
- D4b.** Cool and warm semi-deserts dominated by xeromorphic growth forms, including succulent (e.g., cacti, euphorbias) and small-leaved shrubs and trees, desert grasses and other xeromorphic growth forms, can be open to very sparse, including very open sandy and rocky vegetation with xeromorphic growth forms. ....**D20**
- D5a.** Treed vegetation of uplands .....**D6**
- D5b.** Treed vegetation of wetlands (site periodically) or riparian areas that have a high water tables nearby that plants can access (riparian). ....**D9**
- D6a.** Vegetation dominated by Pinyon and Juniper species. ....  
.....**D010 Western North American Pinyon - Juniper Woodland & Scrub**
- D6b.** Forests not as above .....**D7**
- D7a.** Forests or woodlands of aspen, oak and mixed hardwoods found throughout the Great Plains, from central Kansas to the Canadian aspen parkland region. ....  
.....**D326 North American Great Plains Forest & Woodland \***
- D7b.** Forests not as above .....**D8**
- D8a.** Forests and woodlands in the cool maritime temperate climates of western North America characterized by conifers such as *Abies amabilis*, *Abies grandis*, *Abies concolor* var. *lowiana*, *Abies magnifica*, *Abies procera*, *Calocedrus decurrens*, *Chamaecyparis nootkatensis*, *Chamaecyparis lawsoniana*, *Picea sitchensis*, *Pinus contorta* var. *contorta*, *Pinus jeffreyi*, *Pinus lambertiana*, *Pinus ponderosa* var. *benthamiana*, *Pseudotsuga menziesii* var. *menziesii*, *Sequoia sempervirens*, *Sequoiadendron giganteum*, *Thuja plicata*, *Tsuga heterophylla*, and *Tsuga mertensiana*; or broadleaf trees *Acer macrophyllum*, *Alnus rubra*, *Arbutus menziesii*, *Lithocarpus densiflorus*, *Quercus chrysolepis*, and *Quercus kelloggii*..... **D192 Vancouverian Forest & Woodland**
- D8b.** Forests, woodlands and savannas of the mountains of continental temperate climates of western North America characterized by the conifers *Abies concolor*, *Abies grandis*, *Abies lasiocarpa*, *Abies religiosa*, *Juniperus* spp. (*Juniperus osteosperma*, *Juniperus scopulorum*), *Larix lyallii*, *Larix occidentalis*, *Picea engelmannii*, *Picea engelmannii* x *glauca* hybrids, *Picea pungens*, *Pinus albicaulis*, *Pinus aristata*, *Pinus contorta* var. *latifolia*, *Pinus flexilis*, *Pinus hartwegii*, *Pinus longaeva*, *Pinus ponderosa* (var. *brachyptera*, var. *ponderosa*, var. *scopulorum*), *Pseudotsuga menziesii* var. *glauca*,

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- Thuja plicata*, and *Tsuga heterophylla*. Associated deciduous hardwoods are infrequent and include *Acer grandidentatum*, *Betula papyrifera*, and *Populus tremuloides*. .....  
..... **D194 Rocky Mountain Forest & Woodland**
- D9a.** Swamp and floodplain forests and woodlands found in poorly-drained basins or along lakeshores and deciduous wet forests along small- to large-sized rivers (on a wide range of soil types), across much of cool-temperate eastern North America.....  
..... **D011 Eastern North American-Great Plains Flooded & Swamp Forest \***
- D9b.** Wetland or riparian forests not like above ..... **D10a**
- D10a.** Forested riparian and depressional wetlands dominated by broad-leaved deciduous trees or conifers (or both); at mid to high elevations of the Rocky Mountains, ranges of the Intermountain West, the Colorado Plateau, the Sierra Nevada and eastern Cascades.....  
..... **D195 Rocky Mountain-Great Basin Montane Flooded & Swamp Forest**
- D10b.** Wetland or riparian forests not like above ..... **D11**
- D11a.** Forested wetlands of temperate maritime climates from southern Alaska to northern California, including riparian forests, rich swamps, and poor peat swamps. Lowland riparian forests characterized by broad-leaf *Acer macrophyllum*, *Alnus rubra*, *Populus balsamifera ssp. trichocarpa*, *Salix lucida ssp. lasiandra* or *Fraxinus latifolia* (in southern part of range), or conifers including *Abies grandis*, *Picea sitchensis* or *Thuja plicata*. Montane riparian areas generally conifer-dominated, species include *Abies amabilis*, *Abies concolor*, *Abies magnifica*, *Pinus contorta var. murrayana*, *Populus tremuloides*, and/or *Tsuga mertensiana*. .....  
..... **D193 Vancouverian Flooded & Swamp Forest**
- D11b.** Lowland riparian forests and woodlands dominated by broad-leaved deciduous trees (cottonwoods (*Populus*), sycamores (*Platanus*), and hackberries (*Celtis*)) and palms (*Washingtonia*) that occur along perennial and intermittent rivers, springs and oases of the California Central Valley, southwest U.S. deserts, and the Tamaulipan region of south Texas and adjacent Mexico.....  
..... **D013 Western North American Interior Flooded Forest**
- D12a.** Shrub- and herb-dominated vegetation of uplands..... **D13**
- D12b.** Shrub- and herb-dominated vegetation of wetlands and riparian areas ..... **D16**
- D13a.** Vegetation of the central plains of North America, predominately grasslands commonly referred to as shortgrass, mixedgrass and tallgrass prairie, interspersed with evergreen and deciduous shrublands. Found on glaciated or non-glaciated substrates, rolling to rugged topography, and fine-textured to coarse-textured soils. .... **D023 Central North American Grassland & Shrubland \***
- D13b.** Vegetation not like above in all respects ..... **D14**
- D14a.** Chaparral shrublands occurring between low-elevation desert landscapes and higher subalpine woodlands of the western U.S. and northern Mexico. Characteristic genera include *Arctostaphylos*, *Ceanothus*, *Cercocarpus*, and *Quercus*..... **D061 Western North American Interior Chaparral**
- D14b.** Vegetation not like above in all respects ..... **D15**
- D15a.** Lowland to subalpine shrubland, grassland, and meadow communities in temperate mountainous regions of western North America, dominated by cold-deciduous shrubs, cool-season bunchgrasses or mesic forbs. Strong diagnostic species that are often dominant or codominant include *Acer glabrum*, *Amelanchier utahensis*, *Ribes cereum*, and *Symphoricarpos oreophilus*. Moderate diagnostics include *Holodiscus discolor*, *Holodiscus dumosus*, *Menziesia ferruginea*, *Physocarpus malvaceus*, *Physocarpus monogynus*, *Rosa nutkana*, *Rosa woodsii*, and *Vaccinium ovalifolium*, among many others. See description for all diagnostic species. ....  
..... **D022 Western North American Grassland & Shrubland**
- D15b.** Californian scrub (chaparral), grassland and meadow vegetation within the warm-temperate Californian Floristic Province, from southwestern Oregon through California, west of the Sierra-Cascades divide and south into northwestern Baja California, Mexico. Characteristic genera include *Adenostoma*, *Arctostaphylos*, *Artemisia*, *Baccharis*, *Ceanothus*, *Eriogonum*, *Frangula*, *Malosma*, *Nassella*, *Quercus*, *Rhus*, and *Salvia*. For dominant species see full description. ....  
..... **D327 Californian Scrub & Grassland**
- D16a.** Open and treed bogs and fens throughout much of North America from the boreal zone in Canada south to northern California, montane areas in the western United States, the northern Great Plains, and much of the midwestern and northeastern United States and southeastern Canada.....  
..... **D029 North American Bog & Fen**
- D16b.** Wetlands or riparian areas not like above in all respects ..... **D17**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- D17a.** Freshwater wetlands ..... **D18**
- D17b.** Alkaline, saline or brackish wetlands ..... **D19**
- D18a.** Marshes, wet meadows and shrublands, singly and in mosaics, along riparian corridors, around vernal pools, depressions, seeps and springs on mineral soils or shallow organic layers over mineral substrates in temperate and southern boreal latitudes of western North America. ....  
**D031 Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland**
- D18b.** Vegetation in eastern cool-temperate and boreal North America, including the Great Plains. Dominated by shrubs or non-hydromorphic herbaceous plants that are facultatively to obligately adapted to freshwater wetland conditions; in mineral or mucky organic soils with regular (intermittent to permanent) saturated and flooded conditions.....  
**D323 Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland\***
- D19a.** Brackish marsh and saline wet meadows found along shallow lakes and basins and surrounding areas across the Great Plains of North America. ....  
..... **D033 North American Great Plains Saline Marsh \***
- D19b.** Saline-alkaline wetlands of North American interior west, including salt flats, marshes and seeps, whose species composition is driven by water chemistry and duration and seasonality of wetness. Stands range from sparse cover of shrubs and/or herbs to productive marshes dominated by tall emergent graminoids.....  
..... **D036 North American Western Interior Brackish Marsh, Playa & Shrubland**
- D20a.** Aridland shrublands and grasslands dominated by xerophytic woody shrubs, succulents and grasses that occur among the lowland intermountain basins and foothills of desert mountain ranges across the southwestern U.S. and northern Mexico. Characteristic genera include *Ambrosia* (ambrosia), *Acacia* (acacia), *Agave* (agave), *Bouteloua* (grama), *Carnegiea* (saguaro), *Dasylirion* (sotal), *Flourensia* (tarbush), *Fouquieria* (ocotillo), *Larrea* (creosotebush), *Muhlenbergia* (muhly-sotal), *Olneya* (ironwood), *Parkinsonia* (paloverde), *Pleuraphis*, and *Prosopis* (mesquite). Ruderal vegetation dominated by non-native taxa (e.g., *Brassica nigra* (black mustard), *Brassica tournefortii* (Asian mustard), *Bromus madritensis* (compact brome), *Bromus rubens* (red brome), *Eragrostis lehmanniana* (Lehmann's lovegrass), and *Schismus barbatus* (common Mediterranean grass) are also included. .... **D039 North American Warm Desert Scrub & Grassland \***
- D20b.** Shrublands, shrub-steppe and grasslands within cool semi-desert climates of western North America. Includes shrublands dominated by *Artemisia tridentata*, *Atriplex* spp., *Yucca* spp., *Nolina* spp., *Buddleja*, *Coleogyne*, *Ephedra*, *Ericameria*, *Mortonia*, *Poliomintha*, etc.) Grasslands taxa are predominantly cool-season species, including *Achnatherum*, *Hesperostipa*, *Poa*, *Festuca*, *Elymus*, *Leymus*, *Pascopyrum*, and *Pseudoroegneria*. Warm-season grass genera (e.g., *Pleuraphis*, *Bouteloua*, and *Muhlenbergia*) are important in the southern areas. Ruderal grasslands or forblands dominated by non-native Eurasian taxa (e.g., *Bromus tectorum*, *Acroptilon repens*, *Isatis tinctoria*, *Sisymbrium* spp., *Taeniatherum caput-medusae*) and *Agropyron cristatum*) are also included .....  
..... **D040 Western North American Cool Semi-Desert Scrub & Grassland**

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# Key to USNVC Upland Macrogroups, Groups and Alliances in the Northern Basin and Range and Columbia Plateau Ecoregions (Selected Divisions)

## 1.B.2 Cool Temperate Forest & Woodland

### D194 Rocky Mountain Forest & Woodland

**M1a.** Macrogroup of mesic to moist conifer forests and woodlands of the lower montane zone of the central Rocky Mountains and interior Pacific Northwest, including the eastern Cascades from western Montana west through northern Idaho into northeastern Washington and southern and central British Columbia, and south into the northwestern Blue Mountains of Oregon. *Abies grandis* (grand fir), *Larix occidentalis* (western larch), *Pseudotsuga menziesii* (Douglas-fir), *Thuja plicata* (western red-cedar), or *Tsuga heterophylla* (western hemlock) are the major dominants. Other major associated trees include *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Picea engelmannii x glauca* hybrids, *Picea glauca* (white spruce), *Pinus contorta* (lodgepole pine), and *Pinus monticola* (western white pine) are major associates. *Pinus ponderosa* (ponderosa pine) may be present but only on the warmest and driest sites. ....**G4**

..... **M500 Central Rocky Mountain Mesic Lower Montane Forest**

**M1b.** Vegetation is not as above. Stands are not dominated by diagnostic trees *Abies grandis* (grand fir), *Larix occidentalis* (western larch), *Thuja plicata* (western red-cedar), or *Tsuga heterophylla* (western hemlock). If dominated by *Pseudotsuga menziesii* (Douglas-fir), then diagnostic trees are typically present. ....**M2**

**M2a.** Macrogroup of conifer forests, woodlands and savannas found on dry settings of the lower montane to foothill zones of the interior Pacific Northwest, and extending east into the northwestern Great Plains on escarpments and rock outcrops. *Pinus ponderosa var. ponderosa* (ponderosa pine) or *Pinus ponderosa var. scopulorum* (ponderosa pine), *Pseudotsuga menziesii* (Douglas-fir), *Pinus flexilis* (limber pine), or *Juniperus osteosperma* (Utah juniper) or *Juniperus scopulorum* (Rocky Mountain juniper). Other occasional trees may include *Pinus contorta* (lodgepole pine), *Picea engelmannii* (Engelmann spruce), *Picea glauca* (white spruce) (or their hybrid), and in the Great Plains, deciduous trees such as *Acer negundo* (box-elder), *Betula papyrifera* (paper birch), *Fraxinus pennsylvanica* (green ash), *Populus tremuloides* (quaking aspen), *Quercus macrocarpa* (bur oak), and *Ulmus americana* (American elm).....**G5**

..... **M501 Central Rocky Mountain Dry Lower Montane-Foothill Forest**

**M2b.** Vegetation is not as above.....**M3**

**M3a.** Macrogroup of high montane and subalpine forests/woodlands in mountainous regions of the western U.S. and southwestern Canada. Characteristic trees include *Abies lasiocarpa* (subalpine fir), *Larix lyallii* (subalpine larch), *Picea engelmannii* (Engelmann spruce), *Pinus albicaulis* (whitebark pine), *Pinus aristata* (bristlecone pine), *Pinus contorta* (lodgepole pine), *Pinus flexilis* (limber pine), *Pinus longaeva* (Great Basin bristlecone pine), *Populus tremuloides* (quaking aspen), and *Tsuga mertensiana* (mountain hemlock) (which is also important in Pacific maritime macrogroups). Varies from nearly closed-canopy forests to very open or patchy short-statured woodlands, clumps of tree islands or ribbons with intervening grasslands or shrublands near upper treeline.....**G6**

..... **M020 Rocky Mountain Subalpine-High Montane Conifer Forest**

**M3b.** Conifer and mixed deciduous-conifer macrogroup of lower montane forests, woodlands and savannas of the southern Rocky Mountains, Colorado Plateau, and Great Basin. Characteristic trees include *Abies concolor* (white fir), *Juniperus scopulorum* (Rocky Mountain juniper), *Pinus ponderosa* (ponderosa pine) (primarily *var. scopulorum* and *var. brachyptera*), *Pseudotsuga menziesii* (Douglas-fir), and the less extensive *Picea pungens* (blue spruce). *Populus tremuloides* (quaking aspen) may be present to codominant in the tree canopy. Other associated conifers in transitional stands include *Abies lasiocarpa var. arizonica* (corkbark fir), *Abies lasiocarpa var. lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Pinus contorta* (lodgepole pine), and *Pinus flexilis* (limber pine), or at lower elevation *Pinus edulis* (two-needle pinyon). ....

..... **M022 Southern Rocky Mountain Lower Montane Forest\***

### M500 Central Rocky Mountain Mesic Lower Montane Forest

**G4a.** A group of forests, woodlands or "savannas" of the central Rocky Mountains that are dominated by the deciduous conifer, *Larix occidentalis* (western larch), as well as mixed stands dominated by *Abies grandis* (grand fir) where *Pseudotsuga menziesii* (Douglas-fir) may be an early-seral component, codominant or the sole dominant species. *Larix occidentalis* (western larch) dominated stands are typically initiated following stand-replacing crown fires of other conifer forests, and

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maintained by a higher frequency, surface-fire regime. Fire suppression has led to invasion of the more shade-tolerant tree species such as *Abies grandis* (grand fir), *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Pseudotsuga menziesii* (Douglas-fir), or *Tsuga* (hemlock) spp. that may be present in the understory of *Larix* (larch) stands or form mixed canopy stands. ....A11

**G211 Central Rocky Mountain Mesic Grand Fir - Douglas-fir Forest**

**G4b.** Conifer group of the eastern Cascades of Washington and Oregon that is dominated by a mix of *Pseudotsuga menziesii* (Douglas-fir) with *Abies grandis* (grand fir). Several other conifers such as *Pinus contorta* (lodgepole pine), *Pinus monticola* (western white pine), and/or *Larix occidentalis* (western larch) can dominate or codominate; common shrub species include *Acer circinatum* (vine maple), *Cornus nuttallii* (Pacific dogwood), *Mahonia nervosa* (Cascade barberry), *Paxistima myrsinites* (Oregon boxleaf), *Rubus parviflorus* (thimbleberry), *Spiraea betulifolia* (white spirea), and *Symphoricarpos hesperius* (trailing snowberry). .....A12

..... **G212 East Cascades Mesic Grand Fir - Douglas-fir Forest**

**M501 Central Rocky Mountain Dry Lower Montane-Foothill Forest**

**G5a.** Inland Pacific Northwest woodland and savanna group is found in the foothills of the central Rocky Mountains in the Columbia Plateau region and west along the foothills of the Modoc Plateau and eastern Cascades into southern interior British Columbia, occurring at the lower treeline/ecotone between grasslands or shrublands and more mesic coniferous forests, typically on warm, dry, exposed sites. This group includes two physiognomic phases: true woodlands of *Pinus ponderosa* (ponderosa pine) with shrubby or grassy understories, and "wooded steppes" with widely spaced, scattered *Pinus ponderosa* (ponderosa pine) trees over generally shrubby but sparse understories. ....A13

..... **G213 Central Rocky Mountain Ponderosa Pine Open Woodland**

**G5b.** This *Pseudotsuga menziesii* (Douglas-fir)-dominated forest and woodland group occurs throughout the middle Rocky Mountains of central and southern Idaho, south and east into the Greater Yellowstone region, including the Bighorn, Gros Ventre and Wind River ranges of Wyoming, and north into Montana on the east side of the Continental Divide to near the McDonald Pass and also along the Rocky Mountain Front region and central "sky island" ranges of Montana. In the Central Rockies the southern monsoon influence is less and maritime climate regime is not important, and so stands lack maritime floristics. Additional trees present include *Populus tremuloides* (quaking aspen) in relatively mesic sites, *Pinus flexilis* (limber pine) on calcareous substrates and *Pinus contorta* (lodgepole pine) at higher elevations. ....A14

..... **G215 Middle Rocky Mountain Montane Douglas-fir Forest & Woodland**

**M020 Rocky Mountain Subalpine-High Montane Conifer Forest**

**G6a.** A group of upland forests dominated by *Populus tremuloides* (quaking aspen) without significant conifer cover and an understory structure of complex multiple shrub and herbaceous layers, or simply just an herbaceous layer. It is widespread in the southern and central Rocky Mountains but occurs in the montane and subalpine zones throughout much of the western U.S., south into northern Mexico and north into Canada. ....A15

**G222 Rocky Mountain Subalpine-Montane Aspen Forest & Woodland**

**G6b.** Vegetation dominated by conifers. *Populus tremuloides* may be present to codominant, but not dominant. ....G7

**G7a.** Vegetation is a high-elevation forest dominated by *Picea engelmannii* (Engelmann spruce) and/or *Abies lasiocarpa* (subalpine fir).....G8

**G7b.** Vegetation is a high-elevation forest, woodland, or krummholz characterized by *Pinus flexilis* (limber pine), *Pinus longaeva* (Great Basin bristlecone pine) *Picea glauca* (white spruce), *Pinus contorta* (lodgepole pine), *Pinus aristata* (Rocky Mountain bristlecone pine), or *Pinus albicaulis* (whitebark pine). ....G9

**G8a.** Spruce-fir forest group of the drier sites within the subalpine zone of the east Cascades and Rocky Mountains with *Picea engelmannii* (Engelmann spruce) and *Abies lasiocarpa* (subalpine fir) dominating either mixed or alone; relatively dry to xeric understory. Diagnostic species may include *Amelanchier alnifolia* (Saskatoon serviceberry), *Juniperus communis* (common juniper), *Mahonia repens* (creeping barberry), *Physocarpus malvaceus* (mallow ninebark), *Shepherdia canadensis* (russet buffaloberry), *Vaccinium myrtillus* (whortleberry), or *Vaccinium scoparium* (grouse whortleberry).....A18

**G219 Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest & Woodland**

**G8b.** High elevation spruce-fir forest group on mesic sites within the Rocky Mountains and eastern Cascades; dominated by *Picea engelmannii* (Engelmann spruce) and *Abies lasiocarpa* (subalpine fir). Typically in locations with cold-air drainage or ponding, or where snowpack lingers late into

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the summer. Moisture-loving understory species are diagnostic; shrubs *Cornus canadensis* (bunchberry dogwood), *Ledum glandulosum* (western Labrador-tea) (rare), *Menziesia ferruginea* (rusty menziesia), *Phyllodoce empetriformis* (pink mountainheath), *Rhododendron albiflorum* (Cascade azalea), *Rubus parviflorus* (thimbleberry), *Salix* (willow) spp. and *Vaccinium membranaceum* (thinleaf huckleberry). Mesic to wet herbaceous species include *Actaea rubra* (red baneberry), *Calamagrostis canadensis* (bluejoint), *Clintonia uniflora* (bride's bonnet), *Erigeron eximius* (sprucefir fleabane), *Gymnocarpium dryopteris* (western oakfern), *Luzula glabrata* var. *hitchcockii* (Hitchcock's smooth woodrush), *Maianthemum stellatum* (starry false lily of the valley), *Rubus pedatus* (strawberryleaf raspberry), *Saxifraga bronchialis* (yellowdot saxifrage), *Thalictrum* (meadowrue) spp., *Tiarella* (foamflower) spp., and *Valeriana sitchensis* (Sitka valerian). This group is rare in the Central Basin and Range ecoregion so no alliances from this group are included in key.....**A22**

**G218 Rocky Mountain Subalpine Moist Spruce - Fir Forest & Woodland**

**G9a.** A group of open woodlands ranging from krummholz to over 10 m in height with *Pinus flexilis* (limber pine) and/or *Pinus longaeva* (Great Basin bristlecone pine) as the dominant conifer with an herbaceous layer that is typically sparse. On steep slopes and ridges between 2530 and 3600 m (8300-12,000 feet) elevation, in the Mojave Desert and eastern Sierra Nevada, central Great Basin to the high plateaus of southwestern and central Utah. ....**A26**

**G224 Intermountain Basins Subalpine Limber Pine - Bristlecone Pine Woodland\***

**G9b.** Vegetation is not as above. Forests or woodlands are not characterized by dominance of *Pinus flexilis* (limber pine) and/or *Pinus longaeva* (Great Basin bristlecone pine). ....**G10**

**G10a.** This group occupies upper montane and subalpine elevations of the Rocky Mountains, and is dominated by *Pinus contorta* (lodgepole pine) with shrub, grass, or barren understories, typically on well-drained, gravelly, coarse-textured, and acidic parent materials. ....**A27**

**G220 Rocky Mountain Lodgepole Pine Forest & Woodland**

**G10b.** Vegetation is not as above. Other forests and woodlands characterized by *Picea glauca* (white spruce), *Pinus flexilis* (limber pine), *Pinus aristata* (Rocky Mountain bristlecone pine), *Larix lyallii* (subalpine larch), and *Pinus albicaulis* (whitebark pine) that occurs as Groups within the Rocky Mountain Subalpine-High Montane Conifer Forest Macrogroup, but are not found in the Central Basin and Range ecoregion are listed below. No alliances from these groups are included in this key. .... **G345 Central Rocky Mountain Montane White Spruce Forest\***

..... **G221 Rocky Mountain Subalpine-Montane Limber Pine - Bristlecone Pine Woodland\***

..... **G223 Northern Rocky Mountain Whitebark Pine - Subalpine Larch Woodland\***

**G211 Central Rocky Mountain Mesic Grand Fir - Douglas-fir Forest**

**A11a.** This alliance is composed of seral forests are dominated by *Larix occidentalis* (western larch) and reported from the northern Rocky Mountains in northwestern Montana, and occur in Idaho, Washington, Oregon and possibly British Columbia, Canada. ....

**A0275 Larix occidentalis Central Rocky Mountain Forest Alliance**

**A11b.** This alliance is composed of forests and woodlands dominated by *Abies grandis* (grand fir) where *Pseudotsuga menziesii* (Douglas-fir) may be an early-seral component, codominant or the sole dominant species. Stands occur in the middle to northern Rocky Mountains and occasionally in the Cascade Range .....

**A3362 Abies grandis - Pseudotsuga menziesii Central Rocky Mountain Forest & Woodland Alliance**

**G212 East Cascades Mesic Grand Fir - Douglas-fir Forest**

**A12a.** This alliance is dominated by *Tsuga heterophylla* (western hemlock) often with *Thuja plicata* (western red-cedar) or *Abies grandis* (grand fir). Diagnostic undergrowth species reflect Pacific Northwest and Cascadian origin with such species as *Rhododendron albiflorum* (Cascade azalea), *Tiarella trifoliata* (threeleaf foamflower), and *Gymnocarpium dryopteris* (western oakfern). Rocky Mountain species may be present, but the overall floristics of these forests are of Cascadian and Pacific Northwest origin. Stands occur in moist, protected coves on the eastern side of the Cascade Range, in the Blue Mountains and western slopes of the Rocky Mountains. ....

..... **A3582 Tsuga heterophylla - Abies grandis Cascadian Mesic Cove Forest Alliance**

**A12b.** This alliance consists of forests dominated by *Abies grandis* (grand fir) or a mix of *Pseudotsuga menziesii* (Douglas-fir) with *Abies grandis* (grand fir). Several other conifers can dominate or codominate, including *Pinus contorta* (lodgepole pine), *Pinus monticola* (western white pine), and *Larix occidentalis* (western larch). It occurs along the eastern slope

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of the Cascades south of Lake Chelan, in the eastern Okanogan Highlands in Washington, south to Mount Hood in Oregon. ....  
..... **A3583 *Abies grandis* - *Pseudotsuga menziesii* Mesic Cascadian Forest Alliance**

**G213 Central Rocky Mountain Ponderosa Pine Open Woodland**

**A13a.** These are *Pinus ponderosa* (ponderosa pine)-dominated woodlands with shrub-dominated understories and "wooded steppes" with widely spaced, scattered *Pinus ponderosa* (ponderosa pine) trees over generally shrubby but sparse understories that occur at the lower treeline/ecotone on warm, dry, exposed sites. This inland Pacific Northwest alliance occurs in the foothills of the central Rocky Mountains in the Columbia Plateau region and west along the foothills of the Modoc Plateau and eastern Cascades into southern interior British Columbia. It also occurs east across Idaho into the eastern foothills of the Montana Rockies. ....

..... **A3446 *Pinus ponderosa* / Shrub Understory Central Rocky Mountain Woodland Alliance**

**A13b.** These *Pinus ponderosa* (ponderosa pine)-dominated woodlands and savannas occur at the lower treeline/ecotone between grasslands, typically on warm, dry, exposed sites and are characterized by grassy understories that are generally fire-maintained. This inland Pacific Northwest alliance occurs in the foothills of the central Rocky Mountains in the Columbia Plateau region and west along the foothills of the Modoc Plateau and eastern Cascades into southern interior British Columbia. It also occurs east across Idaho into the eastern foothills of the Montana Rockies. ....

..... **A3447 *Pinus ponderosa* / Herbaceous Understory Central Rocky Mountain Open Woodland Alliance**

**G215 Middle Rocky Mountain Montane Douglas-fir Forest & Woodland**

**A14a.** This forest and woodland alliance is dominated by *Pseudotsuga menziesii* (Douglas-fir) and occurs on relatively dry to mesic sites throughout the middle Rocky Mountains of central and southern Idaho, the Greater Yellowstone region, and the Wind River, Gros Ventre and Bighorn ranges of Wyoming and in Montana on the east side of the Continental Divide. ....

..... **A3462 *Pseudotsuga menziesii* Middle Rocky Mountain Dry-Mesic Forest & Woodland Alliance**

**A14b.** This forest and woodland alliance is dominated by *Pseudotsuga menziesii* (Douglas-fir) without the maritime floristic composition. It occurs on relatively moist, cool to warm sites throughout the middle Rocky Mountains of central and southern Idaho, the Greater Yellowstone region, and the Wind River, Gros Ventre and Bighorn ranges of Wyoming and in Montana on the east side of the Continental Divide. ....

..... **A3463 *Pseudotsuga menziesii* Middle Rocky Mountain Mesic-Wet Forest Alliance**

**G222 Rocky Mountain Subalpine-Montane Aspen Forest & Woodland**

**A15a.** Vegetation is dominated by *Populus tremuloides* (quaking aspen). ..... **A16**

**A15b.** Vegetation is dominated or codominated by *Betula papyrifera* or *Acer grandidentatum*. If *Populus tremuloides* (quaking aspen) is present then it has low cover. .... **A17**

**A16a.** Aspen forest alliance widespread in the southern, central and northern Rocky Mountains, west to the Sierra Nevada and east to the Black Hills; defined by a canopy dominated by *Populus tremuloides* (quaking aspen). ....

..... **A2036 *Populus tremuloides* Rocky Mountain Forest & Woodland Alliance**

**A16b.** This alliance is known only from Grand Canyon National Park and El Malpais National Monument and characterized by open woodland or regenerating stands of *Populus tremuloides* (quaking aspen). ....

..... **A4078 *Populus tremuloides* Southern Rocky Mountain Woodland & Scrub Alliance\***

**A17a.** This forest and woodland alliance is found in Alberta, Montana, Washington, and Wyoming and dominated by the successional species *Betula papyrifera* (paper birch). ....

..... **A3367 *Betula papyrifera* Rocky Mountain Forest & Woodland Alliance\***

**A17b.** Alliance of mainly deciduous forests dominated by *Acer grandidentatum* (bigtooth maple) in relatively moist lower montane areas of the Utah-Wyoming Rocky Mountains and Colorado Plateau. ....

..... **A3371 *Acer grandidentatum* Montane Forest Alliance**

**G219 Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest & Woodland**

**A18a.** This forest and woodland alliance is dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce). Stands structure may take on a ribbon forest or tree

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- island form or have understory characterized by alpine herbaceous species. *Pinus flexilis* (limber pine) and *Pinus aristata* (bristlecone pine) if present are minor components in the canopy and very infrequent in the understory. It occurs below krummholz at or near treeline in the Front Range of the Rocky Mountains in Colorado and Wyoming. .... **A3642 *Abies lasiocarpa* - *Picea engelmannii* Treeline Dry-Mesic Forest Alliance\***
- A18b.** Vegetation does not occur at or near upper treeline in the Front Range of the Rocky Mountains in Colorado and Wyoming with a ribbon forest or tree island stand structure or have and understory characterized by alpine herbaceous species.....**A19**
- A19a.** Forest and woodland alliance of the northern, central and southern Rocky Mountains occurs on talus and scree slopes; dominated by *Abies lasiocarpa* (subalpine fir) or *Picea engelmannii* (Engelmann spruce). .... **A3644 *Abies lasiocarpa* - *Picea engelmannii* Dry-Mesic Scree & Talus Woodland Alliance**
- A19b.** Site is not scree vegetated scree characterized by *Abies lasiocarpa* (subalpine fir) or *Picea engelmannii* (Engelmann spruce). ....**A20**
- A20a.** Forest alliance of the southern and central Rocky Mountains and Intermountain West with mixed canopies codominated by *Abies lasiocarpa* (subalpine fir) and *Populus tremuloides* (quaking aspen). .... **A3645 *Abies lasiocarpa* - *Populus tremuloides* Rocky Mountain Dry-Mesic Forest Alliance**
- A20b.** Vegetation is not codominated by *Populus tremuloides* (quaking aspen). ....**A21**
- A21a.** This alliance is known from the Colorado Plateau, Arizona - New Mexico Mountains and southern Rocky Mountains and consists of forests dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce). .... **A3641 *Abies lasiocarpa* - *Picea engelmannii* Southern Rocky Mountain Dry-Mesic Forest Alliance**
- A21b.** This alliance is characterized by forests and woodlands with broad distributions throughout the southern, central and northern Rocky Mountains and eastern Cascades dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce).. .... **A3643 *Abies lasiocarpa* - *Picea engelmannii* Rocky Mountain Dry-Mesic Forest Alliance**
- G218 Rocky Mountain Subalpine Moist Spruce - Fir Forest & Woodland**
- A22a.** The forests are known from the middle and northern Rocky Mountains and eastern Cascades and characterized by a canopy dominated by *Tsuga mertensiana* (mountain hemlock). .... **A3617 *Tsuga mertensiana* Rocky Mountain Forest Alliance**
- A22b.** Vegetation is not dominated by *Tsuga mertensiana* (mountain hemlock).....**A23**
- A23a.** This mixed evergreen-deciduous forest alliance is codominated by *Populus tremuloides* (quaking aspen) and *Abies lasiocarpa* (subalpine fir) and has been described from mountain slopes and plateaus in the Rocky Mountains from Alberta, Canada, south to Montana, Wyoming, Colorado, and west into Utah. .... **A0422 *Abies lasiocarpa* - *Populus tremuloides* Rocky Mountain Moist Forest Alliance**
- A23b.** Vegetation is not codominated by *Populus tremuloides* (quaking aspen). ....**A24**
- A24a.** These woodlands of the subalpine Rocky Mountains are associated with talus and scree substrates and dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce). .... **A3616 *Abies lasiocarpa* - *Picea engelmannii* Rocky Mountain Talus & Scree Woodland Alliance**
- A24b.** Site is not scree vegetated scree characterized by *Abies lasiocarpa* (subalpine fir) or *Picea engelmannii* (Engelmann spruce). ....**A25**
- A25a.** These upper montane and subalpine forests and woodlands of the northern Rocky Mountains are dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce). .... **A3614 *Abies lasiocarpa* - *Picea engelmannii* Rocky Mountain Moist Forest Alliance**
- A25b.** These subalpine forests and woodlands of the Rocky Mountains with southern distributions are dominated by *Abies lasiocarpa* (subalpine fir) and/or *Picea engelmannii* (Engelmann spruce). ....

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

..... **A3615 *Abies lasiocarpa* - *Picea engelmannii* Southern Rocky Mountain Moist Forest Alliance**

**G224 Intermountain Basins Subalpine Limber Pine - Bristlecone Pine Woodland**

**A26a.** Widely scattered subalpine forest and woodland alliance dominated by *Pinus longaeva* (Great Basin bristlecone pine), although some stands may be codominated by *Abies concolor* var. *concolor* (white fir) and *Pinus ponderosa* (ponderosa pine). Mountain slopes throughout the Great Basin into western Utah. .... **A0518 *Pinus longaeva* Forest & Woodland Alliance\***

**A26b.** Forests and woodlands dominated or codominated by the evergreen needle-leaved tree *Pinus flexilis* (limber pine); central Great Basin, Columbia Plateau, middle and southern Rocky Mountains and Wyoming Basins. .... **A2035 *Pinus flexilis* Intermountain Basins Forest & Woodland Alliance\***

**G220 Rocky Mountain Lodgepole Pine Forest & Woodland**

**A27a.** This alliance is composed of seral forests characterized by an open to moderately closed, mixed evergreen-deciduous tree canopy that is codominated by *Populus tremuloides* (quaking aspen) and *Pinus contorta* (lodgepole pine). Stands occur on mountain slopes and plateaus in Utah, Idaho, Colorado and Wyoming. .... **A0424 *Pinus contorta* - *Populus tremuloides* Rocky Mountain Forest Alliance**

**A27b.** Vegetation is not codominated by *Populus tremuloides* (quaking aspen). If present, *Populus tremuloides* (quaking aspen) has low cover in the tree canopy. .... **A28**

**A28a.** This alliance is characterized by open-canopy woodlands dominated by *Pinus contorta* (lodgepole pine), rarely with other mature tree species in the canopy. Understory is typically patchy with low cover. The relatively open tree canopy (< 60% cover) is related to unusually dry or cold topo-edaphic situations such as excessively well-drained pumice deposits, shallow rocky soils with little water-holding capacity often on warm aspects, and well-drained to xeric stabilized sand dunes. It is found in mainly montane and subalpine zones of the northern Rocky Mountains and eastern Cascade Range, but extends into the southern Rocky Mountains. .... **A4079 *Pinus contorta* Rocky Mountain Woodland Alliance**

**A28b.** This alliance is characterized by forests primarily dominated by *Pinus contorta* (lodgepole pine). Other more shade-tolerant tree species are typically present to abundant as seedlings and saplings. Stands may be even-aged or multi-aged depending on geographic location, edaphic characteristics, and how the stands were established following wildfire. Shrub and herbaceous layers may be present or absent depending on tree canopy. It occurs in the upper montane and subalpine zones of the Rocky Mountains and the eastern Cascade Range. .... **A3366 *Pinus contorta* Rocky Mountain Forest Alliance**

**D010 Western North American Pinyon - Juniper Woodland & Scrub**

**M1a.** Variable pinyon and juniper woodland and savanna macrogroup characterized by *Pinus monophylla* (singleleaf pinyon), *Juniperus occidentalis* (western juniper), *Juniperus osteosperma* (Utah juniper), *Juniperus californica* (California juniper) and/or *Cercocarpus ledifolius* (curl-leaf mountain-mahogany). Occurs in the Great Basin north and east into the Columbia Plateau, Wyoming and Montana, east into the Colorado Plateau, and desert ranges in the Mojave Desert and eastern foothills of the Sierra Nevada. .... **G2**

**M026 Intermountain Singleleaf Pinyon - Juniper Woodland**

**M1b.** Pinyon and juniper savanna and woodland macrogroup characterized by *Pinus edulis* (two-needle pinyon) and/or *Juniperus monosperma* (one-seed juniper) or *Juniperus osteosperma* (Utah juniper), with an understory dominated by shrubs or grasses; Madrean indicator species lacking. Centered in the Colorado Plateau and east across southern Colorado, northern New Mexico, and on breaks in the southwestern Great Plains. .... **M027 Southern Rocky Mountain-Colorado Plateau Two-needle Pinyon - Juniper Woodland\***

**M026 Intermountain Singleleaf Pinyon - Juniper Woodland**

**G2a.** This woodland and savanna group is centered on the Columbia Plateau and extends from the eastern foothills of the Cascades and the Modoc Plateau across the northern margin of the Great Basin and is characterized by an open to closed canopy of *Juniperus occidentalis* (western juniper) that is sometime codominated by *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) and typically has a shrubby understory dominated by *Artemisia tridentata* (big sagebrush). .... **A5**

**G2b.** Vegetation not dominated or codominated by *Juniperus occidentalis* (western juniper). If *Juniperus occidentalis* is present then it occurs with *Pinus monophylla* (singleleaf pinyon), and/or *Juniperus osteosperma* (Utah juniper), in transition zone in southern edge of Northern Basin and Range. .... **G3**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.



- G3a.** *Cercocarpus ledifolius* (curl-leaf mountain-mahogany)-dominated woodland and shrubland group; hills and mountain ranges of the Great Basin from the eastern foothills of the Sierra Nevada northeast to the foothills of the Bighorn Mountains. Includes both tree and shrub forms of *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) with *Artemisia tridentata ssp. vaseyana* (mountain big sagebrush), *Purshia tridentata* (antelope bitterbrush), and species of *Arctostaphylos* (manzanita), *Ribes* (currant), or *Symphoricarpos* (snowberry) often present to codominant in the shrub layer.....**A6**
- G3b.** *Cercocarpus ledifolius*-(curl-leaf mountain-mahogany) may be present to codominant, but does not dominate the woodland or shrubland. ....**G4**
- G4a.** Woodland group characterized by tree canopy of a mix of *Pinus monophylla* (singleleaf pinyon) and *Juniperus osteosperma* (Utah juniper), but either tree species may dominate. There is significant (not accidental) presence of *Pinus monophylla* (singleleaf pinyon). Dry mountain ranges of the Great Basin, eastern foothills of the Sierra Nevada, and scattered locations in southeastern California, including desert mountain ranges. ....**A8**  
**G247 Great Basin Pinyon - Juniper Woodland**
- G4b.** Widespread *Juniperus osteosperma* (Utah juniper) woodland and savanna group. Savanna characterized by open tree canopy of *Juniperus osteosperma* (Utah juniper) trees with high cover of perennial bunchgrasses and forbs; often with inclusions of denser patches of juniper. Woodlands often with a shrub understory. Lacking pinyon trees (*Pinus edulis* (two-needle pinyon) and *Pinus monophylla* (singleleaf pinyon)); if pinyon trees are present, they are accidental (infrequent or limited to special microsites). Dry foothills and sandsheets of the Colorado Plateau and eastern Great Basin (western Colorado to Nevada and southern Idaho, northwestern New Mexico and northern Arizona). ....**G9**  
**G246 Colorado Plateau-Great Basin Juniper Open Woodland**
- G248 Columbia Plateau Western Juniper Open Woodland**
- A5a.** Woodland and savanna alliance characterized by diagnostic tree species *Juniperus occidentalis* (western juniper) that forms an open to moderately dense tree layer with an understory dominated by an open to dense shrub layer (commonly *Artemisia tridentata* (big sagebrush)). It occurs on the Columbia Plateau extending from southwestern Idaho, along the eastern foothills of the Cascades, south to the Modoc Plateau of northeastern California. ....**A3499 Juniperus occidentalis / Shrub Understory Woodland Alliance**
- A5b.** Open woodland and savanna alliance characterized by diagnostic tree species *Juniperus occidentalis* (western juniper) that forms an open to moderately dense tree layer with an understory dominated by a moderately dense to dense layer of perennial grasses and lacking significant cover of shrubs (1-20% cover). It occurs on the Columbia Plateau extending from southwestern Idaho, along the eastern foothills of the Cascades, south to the Modoc Plateau of northeastern California. ....  
..... **A3500 Juniperus occidentalis / Herbaceous Understory Open Woodland Alliance**
- G249 Intermountain Basins Curl-leaf Mountain-mahogany Woodland & Scrub**
- A6a.** Shrubland alliance with an open to moderately dense shrub layer dominated or codominated by the shrub form *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) with a sparse to moderately dense herbaceous layer. ....  
..... **A0828 Cercocarpus ledifolius Scrub Alliance**
- A6b.** Vegetation with open to dense tree form of *Cercocarpus ledifolius* (curl-leaf mountain-mahogany).....**A7**
- A7a.** Woodland alliance with open to moderately dense tree canopy of *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) with the understory characterized by a shrub layer (>10% cover) or, if less, then shrub cover exceeds herbaceous cover. Most common on the east slope of the Sierra Nevada and the Great Basin, but occurs elsewhere in the interior western U.S..... **A0586 Cercocarpus ledifolius / Shrub Understory Woodland Alliance**
- A7b.** Woodland alliance of *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) with an understory of an open to moderate herbaceous layer typically dominated by bunchgrasses. Most common on the east slope of the Sierra Nevada and the Great Basin, but occurs elsewhere in the interior western U.S.....  
..... **A3570 Cercocarpus ledifolius / Herbaceous Understory Woodland Alliance**



**G247 Great Basin Pinyon - Juniper Woodland**

**A8a.** Woodland alliance of *Pinus monophylla* (singleleaf pinyon) that forms an open to dense tree layer often with *Juniperus osteosperma* (Utah juniper) or, less frequently, *Juniperus californica* (California juniper) in southern California. Understory shrubby, from open to moderately dense. ....

.. **A2108 Pinus monophylla - Juniperus osteosperma / Shrub Understory Woodland Alliance**

**A8b.** Open woodland and savanna alliance is characterized by *Pinus monophylla* (singleleaf pinyon), often with *Juniperus osteosperma* (Utah juniper) or, less frequently, *Juniperus californica* (California juniper) in southern California. Understory lacks significant cover of shrubs; typically with an open to dense layer of perennial grasses.....

..... **A2109 Pinus monophylla - Juniperus osteosperma / Herbaceous Understory Open Woodland Alliance**

**G246 Colorado Plateau-Great Basin Juniper Open Woodland**

**A9a.** Juniper woodland alliance with an open to moderately dense, short (<15 m) tree canopy; strongly dominated by *Juniperus osteosperma* (Utah juniper) or *Juniperus scopulorum* (Rocky Mountain juniper) (at higher elevations). A shrubby understory (generally >10% cover). If understory is sparse then shrubs exceed herbaceous cover. Colorado Plateau, west into the Great Basin and north and east into the foothills of the central and southern Rocky Mountains..... **A3496 Juniperus osteosperma / Shrub Understory Woodland Alliance**

**A9b.** Juniper woodland and savanna alliance with an open to moderately dense, short (<15 m) tree canopy strongly dominated by *Juniperus osteosperma* (Utah juniper) or *Juniperus scopulorum* (Rocky Mountain juniper) (at higher elevations). Understory dominated by an open to dense layer of perennial grasses and lacking significant cover of shrubs. Colorado Plateau, west into the Great Basin, and north and east into the foothills of the central and southern Rocky Mountains. ....

..... **A3497 Juniperus osteosperma / Herbaceous Understory Open Woodland Alliance**

**D192 Vancouverian Forest & Woodland**

**M1a.** This macrogroup consists of dry, mixed broadleaf-conifer forests dominated by *Arbutus menziesii* (Pacific madrone) and *Pseudotsuga menziesii* (Douglas-fir) found in lowland areas of the Puget Sound, including the San Juan Islands in Washington and the Gulf Islands in British Columbia, and as far south as the Klamath Mountains in northern California and forests characterized by a mix of *Quercus garryana* (Oregon white oak) and *Pinus ponderosa* (ponderosa pine) or *Pseudotsuga menziesii* (Douglas-fir) found in a narrowly restricted area near lower treeline in foothills of the eastern Cascades in Washington and Oregon, within 65 km (40 miles) of the Columbia River Gorge and in the adjacent Columbia Plateau ecoregion. .... **G3**

..... **M886 Southern Vancouverian Dry Foothill Forest & Woodland**

**M1b.** Vegetation is not as above. If *Pinus ponderosa* (ponderosa pine) or *Pseudotsuga menziesii* (Douglas-fir) are present, then *Quercus garryana* (Oregon white oak) and *Arbutus menziesii* (Pacific madrone) are absent. .... **M2**

**M2a.** This macrogroup includes Jeffery pine - ponderosa pine woodlands; mixed conifer woodlands with *Abies concolor* (white fir), *Calocedrus decurrens* (incense-cedar), *Pinus jeffreyi* (Jeffrey pine), *Pinus lambertiana* (sugar pine), *Pinus ponderosa* (= var. *pacifica*, = var. *benthamiana*) (ponderosa pine), *Pinus washoensis* (= *Pinus ponderosa* var. *washoensis*) (Washoe pine), *Pseudotsuga menziesii* var. *menziesii* (Douglas-fir), or *Sequoiadendron giganteum* (giant sequoia); and *Pinus monticola* (western white pine), and *Abies concolor* var. *lowiana* (white fir) forests. These forests occur in dry habitats found in the foothills and montane elevations of the southern Cascade Range, Klamath Mountains, Modoc Plateau, Sierra Nevada, and Peninsula and Transverse ranges. Additionally, some stands of *Abies bracteata* (bristlecone fir), *Pinus lambertiana* (sugar pine), and *Pinus ponderosa* (ponderosa pine) occur close to the coast, such as in the Santa Lucia Range of the Central Coast, which is the highest coastal range in the U.S. .... **G4**

..... **M023 Southern Vancouverian Montane-Foothill Forest**

**M2b.** Vegetation is not as above. Forests are lowland to subalpine rainforests in the Pacific Northwest west of the high Cascade Range..... **M024 Vancouverian Lowland & Montane Forest\***

..... **M025 Vancouverian Subalpine Forest\***

**M886 Southern Vancouverian Dry Foothill Forest & Woodland**

**G3a.** This narrowly restricted group appears at or near lower treeline in foothills of the eastern Cascades in Washington and Oregon, within 65 km (40 miles) of the Columbia River Gorge and in the adjacent Columbia Plateau ecoregion and is characterized by a mix of *Quercus garryana*

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(Oregon white oak) and *Pinus ponderosa* (ponderosa pine) or *Pseudotsuga menziesii* (Douglas-fir).....**A5**  
..... **G206 Cascadian Oregon White Oak - Conifer Forest & Woodland**

**G3b.** This group consists of dry, mixed broadleaf-conifer forests dominated by *Arbutus menziesii* (Pacific madrone) and *Pseudotsuga menziesii* (Douglas-fir) with an understory that is usually species-rich and well-developed. It is found in lowland areas of the Puget Sound, including the San Juan Islands in Washington and the Gulf Islands in British Columbia, and as far south as the Klamath Mountains and northern Coast Ranges of California. ....  
..... **G800 Southern Vancouverian Dry Douglas-fir - Madrone Woodland\***

### **M023 Southern Vancouverian Montane-Foothill Forest**

**G4a.** This large group consists of montane forests dominated by a single species or a mix of conifers such as *Abies concolor* (white fir), *Calocedrus decurrens* (incense-cedar), *Pinus jeffreyi* (Jeffrey pine), *Pinus lambertiana* (sugar pine), *Pinus ponderosa* (ponderosa pine), *Pseudotsuga menziesii* (Douglas-fir), *Quercus chrysolepis* (canyon live oak), *Quercus kelloggii* (California black oak), and *Pinus monticola* (western white pine). Additional species included in this group that have a more limited range are *Abies bracteata* (bristlecone fir), *Abies magnifica* (California red fir), *Abies x shastensis* (Shasta red fir), *Pinus washoensis* (Washoe pine), *Pseudotsuga macrocarpa* (bigcone Douglas-fir), and *Sequoiadendron giganteum* (giant sequoia). Understories are variable. These forests occur from southern Oregon into Baja California, Mexico. This group includes forests dominated by conifer trees on serpentine (ultramafic) soils. ....**A6**

..... **G344 Californian Montane Conifer Forest & Woodland**

**G4b.** Only one group in this macrogroup. Rekey to from beginning if vegetation is not as above. ...**M1**

### **G206 Cascadian Oregon White Oak - Conifer Forest & Woodland**

**A5a.** This alliance covers stands that are dominated by *Quercus garryana* (Oregon white oak) mixed with *Pinus ponderosa* (ponderosa pine) and/or *Pseudotsuga menziesii* (Douglas-fir). The understory may include dense shrubs or just herbaceous species. This alliance is geographically concentrated on the eastside of the Cascade Range of Oregon and Washington with disjunct stands in southern central Oregon and northern California. ....

..... **A3327 Quercus garryana - Pinus ponderosa / Carex geyeri Woodland Alliance**

**A5b.** This alliance covers savanna, woodland and forest dominated by *Quercus garryana* (Oregon white oak). Codominance by the evergreen conifer *Pseudotsuga menziesii* (Douglas-fir) is common, and *Pinus ponderosa* (ponderosa pine) can be important in some stands. This alliance occurs from southwestern British Columbia to northern California at lower montane on steep, rocky slopes where snow and cold temperatures occur. ....

... **A3328 Quercus garryana - Pseudotsuga menziesii / Toxicodendron diversilobum Forest & Woodland Alliance**

### **G344 Californian Montane Conifer Forest & Woodland**

**A6a.** The alliance is dominated by *Pinus jeffreyi* (Jeffrey pine) or *Pinus washoensis* (Washoe pine) with a dense to open canopy ranging from forests to woodlands to wooded herbaceous stands. Other trees that may be codominant, but *Pinus jeffreyi* (Jeffrey pine) or *Pinus washoensis* (Washoe pine) make up at least half the tree canopy. Associated trees species include *Pinus ponderosa* (ponderosa pine), *Calocedrus decurrens* (incense-cedar), *Chrysolepis chrysophylla* (giant chinquapin), *Pseudotsuga menziesii* (Douglas-fir), *Pinus monticola* (western white pine), *Pinus monophylla* (singleleaf pinyon), *Abies magnifica* (California red fir), and *Abies concolor* (white fir). This alliance occurs on well-drained, productive or infertile soils regardless of parent material throughout much of California, including the east side of the Sierra Nevada and Modoc Plateau area, the Klamath Mountains and northern Coast Ranges..... **A3676 Pinus jeffreyi - Pinus washoensis Mixed Conifer Woodland Alliance**

**A6b.** Vegetation is not as above. If *Pinus jeffreyi* (Jeffrey pine) or *Pinus washoensis* (Washoe pine) are present then they make up less than half the tree canopy. ....**A7**

**A7a.** This alliance is dominated by several conifer trees: *Abies* spp., *Picea breweriana*, and *Pseudotsuga menziesii* with *Chamaecyparis lawsoniana* or *Pinus lambertiana* codominating in some stands. *Picea breweriana* is the diagnostic species as it has the most limited geographic range, without which stands belong to a different alliance. These forests occur at high elevations of the Klamath Mountains in southwestern Oregon and northern California. ...  
..... **A0156 Picea breweriana - Abies concolor Forest Alliance\***

**A7b.** Vegetation is not as above. *Picea breweriana* is absent or if present then 30% relative cover of *Abies bracteata* when codominant with *Quercus chrysolepis*. ....**A8**

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- A8a.** This alliance is codominated by *Pseudotsuga menziesii* (Douglas-fir), *Pinus ponderosa* (ponderosa pine), and *Calocedrus decurrens* (incense-cedar). A variety of other conifers usually co-occur, including *Pinus lambertiana* (sugar pine), *Pinus jeffreyi* (Jeffrey pine), and/or *Pinus attenuata* (knobcone pine). This alliance occurs along the western slope of the southern Oregon Cascades and throughout the Klamath Mountains in Oregon and California, south into the California Coast Ranges. It occurs at low to middle elevations (600-1200 m) with high winter rainfall (75-250 cm), warm to hot, dry summers, and extremely variable geology.....  
.....**A3673 Pinus ponderosa - Calocedrus decurrens - Pseudotsuga menziesii Forest Alliance\***
- A8b.** Vegetation is not as above. Stands are not codominated by *Pseudotsuga menziesii* (Douglas-fir), *Pinus ponderosa* (ponderosa pine), and *Calocedrus decurrens* (incense-cedar) in the tree canopy. ....**A9**
- A9a.** This alliance consists of stands dominated by *Abies bracteata* (bristlecone fir) usually with other tree species such as *Quercus chrysolepis* (canyon live oak). It occurs in steep fire-protected draws, canyons and ravines along the immediate coast and upper slopes of the Santa Lucia Range in central coastal California. If *Quercus chrysolepis* (canyon live oak) is codominant, then *Abies bracteata* (bristlecone fir) has at least 30% relative cover of the tree canopy. .... **A0147 Abies bracteata Forest Alliance\***
- A9b.** Vegetation is not as above. Stands are not dominated by *Abies bracteata* (bristlecone fir). If *Quercus chrysolepis* (canyon live oak) is codominant, then *Abies bracteata* (bristlecone fir) has at less than 30% relative cover of the tree canopy.....**A10**
- A10a.** This alliance consists of forests dominated by *Pseudotsuga macrocarpa* (bigcone Douglas-fir) with or without other tree species, where *Quercus chrysolepis* (canyon live oak) can be a codominant in the upper canopy. *Pseudotsuga menziesii* (Douglas-fir) is typically absent. This montane forest grows on steep to moderate slopes, between 275 and 2400 m in elevation on all aspects, in southern Coast, Peninsular and Transverse ranges of California. ....  
..... **A3675 Pseudotsuga macrocarpa - Quercus chrysolepis Forest Alliance\***
- A10b.** Vegetation is not as above. Stands are not dominated by *Pseudotsuga macrocarpa* (bigcone Douglas-fir). ....**A11**
- A11a.** This alliance consists of mixed conifer forests where *Sequoiadendron giganteum* (giant sequoia) is the dominant or at least characteristic tree, usually with other trees such as *Abies concolor* (white fir), *Calocedrus decurrens* (incense-cedar), *Quercus kelloggii* (California black oak), *Pseudotsuga menziesii* (Douglas-fir), *Pinus jeffreyi* (Jeffrey pine), *Pinus ponderosa* (ponderosa pine), and/or *Pinus lambertiana* (sugar pine). This forest alliance occurs along the western slope of California's Sierra Nevada.....  
.....**A4150 Sequoiadendron giganteum Forest Alliance\***
- A11b.** Vegetation is not as above. *Sequoiadendron giganteum* is not present in the upper tree canopy. ....**A12**
- A12a.** This alliance is characterized by one or more conifer species mixtures, where *Abies concolor* (white fir), *Calocedrus decurrens* (incense-cedar), and/or *Pinus lambertiana* (sugar pine) comprise the predominant canopy. Other conifer species that may present include *Pinus jeffreyi* (Jeffrey pine), *Pinus ponderosa* (ponderosa pine), or *Pseudotsuga menziesii* (Douglas-fir). These mixed mesic conifer forests occur in the cooler, upper elevations of the Klamath-Siskiyou Mountains and Sierra Nevada.....  
..... **A3672 Abies concolor - Pinus lambertiana Forest Alliance\***
- A12b.** Vegetation is not as above. Stand is not characterized by codominance of *Calocedrus decurrens* (incense-cedar), and/or *Pinus lambertiana* (sugar pine) in tree canopy. ....**A13**
- A13a.** This alliance consists of mixed forests with at least two of these three conifers: *Abies concolor* (white fir), *Abies x shastensis* (Shasta red fir), and *Abies magnifica* (California red fir), along with several other conifers that may also be present in the tree canopy. Stands occur from the western slope of the Oregon Cascades near the Rogue-Umpqua divide, south through the Klamath-Siskiyou mountain region to Lassen Peak, California, on the east side of the Cascades in extreme southern Oregon, and is also widespread at high cool elevations in central and southern Sierra Nevada (1983-2440 m [6500-8000 feet]). In the southern Cascade and Siskiyou Mountains it is found at elevations of 1500-2000 m. ....  
.....**A3678 Abies concolor - Abies magnifica - Abies x shastensis Forest Alliance\***
- A13b.** Vegetation is not as above. Stand is not characterized by dominance of *Abies x shastensis* (Shasta red fir) and/or *Abies magnifica* (California red fir) in tree canopy. ....**A14**

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**A14a.** This alliance is distinguished by the dominance of *Abies concolor* (white fir), *Pinus monticola* (western white pine), and *Pinus ponderosa* (ponderosa pine). *Pseudotsuga menziesii* (Douglas-fir) is usually absent. This alliance also includes stands of *Pinus washoensis* (Washoe pine) (limited to the east side of the Sierra Nevada). Stands occur on the Modoc Plateau and Warner Mountains of California, north along the east slope of the southern Cascades in Oregon. ....

..... **A3677 *Abies concolor* - *Pinus ponderosa* Eastern Sierran Forest & Woodland Alliance\***

**A14b.** This alliance consists of stands where the upper tree canopy has a mixed codominance of *Abies concolor* (white fir) and *Pseudotsuga menziesii* (Douglas-fir). Other tree species present may include *Calocedrus decurrens* (incense-cedar), *Chrysolepis chrysophylla* (giant chinquapin), *Cornus nuttallii* (Pacific dogwood), *Pinus ponderosa* (ponderosa pine), *Quercus chrysolepis* (canyon live oak), and/or *Quercus kelloggii* (California black oak). This alliance occurs throughout the Oregon Coast Ranges, southern Cascades and Klamath Mountains south into the California northern Coast Ranges, California Cascades and Sierra Nevada.....

..... **A3674 *Abies concolor* - *Pseudotsuga menziesii* Coastal, Cascadian & Sierran Forest Alliance\***

## 2.B.1 Mediterranean Scrub & Grassland

### D327 Californian Scrub & Grassland

- M1a.** This ruderal macrogroup encompasses the non-native-dominated annual or perennial grasslands, forblands and scrub found in the Californian chaparral region ("Mediterranean" California). Characteristic introduced graminoid species include *Aegilops triuncialis* (barbed goatgrass), *Avena barbata* (slender oat), *Avena fatua* (wild oat), *Brachypodium distachyon* (purple false brome), *Briza maxima* (big quakinggrass), *Bromus diandrus* (ripgut brome), *Bromus hordeaceus* (soft brome), *Bromus rubens* (red brome), *Cynosurus echinatus* (bristly dogstail grass), *Hordeum murinum* (mouse barley), *Lolium perenne ssp. multiflorum* (Italian ryegrass), *Taeniatherum caput-medusae* (medusahead), *Vulpia bromoides* (brome fescue), and *Vulpia myuros* (annual fescue). Introduced forb species include *Brassica nigra* (black mustard), *Carduus pycnocephalus* (Italian plumeless thistle), *Centaurea* (knapweed) spp., *Conium maculatum* (poison hemlock), *Erodium botrys* (longbeak stork's bill), *Erodium cicutarium* (redstem stork's bill), *Foeniculum vulgare* (sweet fennel), *Geranium dissectum* (cutleaf geranium), *Hypochaeris glabra* (smooth cat's ear), and *Medicago polymorpha* (burclover). Non-native ruderal scrub species include *Acacia cyclops*, *Ulex europaeus* (common gorse), *Cytisus scoparius* (Scotch broom), and species of *Genista* (broom) and *Spartium*, among others. If the shrub layer is mostly native dominated, then the herbaceous layer (must be >10% cover) and strongly dominated by non-native species so that the natural understory cannot be determined (usually >90% relative cover non-native). If herbaceous cover then < 10% then treat as sparse understory natural type. The overwhelming dominance of the introduced species is undeniable..... **G2**
- ..... **M046 Californian Ruderal Grassland, Meadow & Scrub**
- M1b.** Vegetation is not as above. Vegetation is dominated by California chaparral, coastal scrub, or native grasslands that are restricted to the western side of the Sierra Nevada.
- ..... **M043 Californian Chaparral\***
- ..... **M044 Californian Coastal Scrub\***
- ..... **M045 Californian Annual & Perennial Grassland\***

### M046 Californian Ruderal Grassland, Meadow & Scrub

- G2a.** This warm-temperate Californian ruderal grassland, forbland and scrub group is most commonly dominated by non-native annual or perennial herbaceous species which usually compose >90% of the total cover. Characteristic species include such as grasses *Avena barbata* (slender oat), *Avena fatua* (wild oat), *Bromus diandrus* (ripgut brome), *Bromus hordeaceus* (soft brome), *Bromus madritensis* (compact brome), *Cortaderia jubata* (purple pampas grass), *Cortaderia selloana* (Uruguayan pampas grass), *Lolium perenne ssp. multiflorum* (Italian ryegrass), *Hordeum murinum* (mouse barley), *Taeniatherum caput-medusae* (medusahead), *Vulpia bromoides* (brome fescue), *Vulpia myuros* (annual fescue), and forbs *Carduus pycnocephalus* (Italian plumeless thistle), *Centaurea* (knapweed) spp., *Erodium botrys* (longbeak stork's bill), *Erodium cicutarium* (redstem stork's bill), *Medicago polymorpha* (burclover), *Geranium dissectum* (cutleaf geranium), *Hypochaeris glabra* (smooth cat's ear), and *Raphanus sativus* (cultivated radish). If the shrub layer is mostly native dominated, then the herbaceous layer (must be >10% cover) and strongly dominated by non-native species so that the natural understory cannot be determined (usually >90% relative cover non-native). If herbaceous cover then < 10% then treat as sparse understory natural type. .... **A3**
- ..... **G497 Californian Ruderal Grassland, Meadow & Scrub**
- G2b.** Only one group in this macrogroup

### G497 Californian Ruderal Grassland, Meadow & Scrub

- A3a.** Vegetation is dominated by perennial non-native species ..... **A4**
- A3b.** Vegetation is dominated by annual non-native species..... **A6**
- A4a.** This alliance consists of stands dominated by *Cortaderia jubata* (purple pampas grass) and/or *Cortaderia selloana* (Uruguayan pampas grass). It occurs primarily in coastal California in disturbed areas, estuaries, inland grasslands, urban areas, and wetlands. ....
- ..... **A1203 Cortaderia jubata - Cortaderia selloana Ruderal Grassland Alliance\***
- A4b.** Vegetation is not as above. *Cortaderia jubata* (purple pampas grass) and/or *Cortaderia selloana* (Uruguayan pampas grass) are absent or have low cover. .... **A5**
- A5a.** This alliance consists of meadows where *Lolium perenne* (perennial ryegrass) is dominant or codominant with other non-natives in the herbaceous layer. It occurs throughout California. Generally, this type occurs in seasonally moist to wet environments that are regularly disturbed through grazing, fire, flooding, or mechanical means. ....

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- .....**A3871 Lolium perenne Ruderal Grassland Alliance**
- A5b.** This alliance consists of meadows dominated by non-native perennial forbs such as *Centaurea biebersteinii* (spotted knapweed), *Centaurea calcitrapa* (red star-thistle), *Centaurea diffusa* (diffuse knapweed), *Centaurea triumphettii* (squarrose knapweed), *Conium maculatum* (poison hemlock), *Daucus carota* (Queen Anne's lace), and/or *Foeniculum vulgare* (sweet fennel). This alliance is found in California and probably north into Oregon.....
- .. **A3872 Centaurea triumphettii - Conium maculatum - Foeniculum vulgare Ruderal Meadow Alliance**
- A6a.** This is a non-native-dominated alliance of annual grasslands and forblands of California and Baja California. The composition varies widely. Many alien annual species may be present, including *Aegilops triuncialis* (barbed goatgrass), *Aira caryophylla* (silver hairgrass), *Avena barbata* (slender oat), *Avena fatua* (wild oat), *Brachypodium distachyon* (purple false brome), *Brassica* (mustard) spp., *Bromus diandrus* (ripgut brome), *Bromus hordeaceus* (soft brome), *Bromus madritensis* (compact brome), *Centaurea melitensis* (Maltese star-thistle), *Centaurea solstitialis* (yellow star-thistle), and *Cynosurus echinatus* (bristly dogstail grass).....
- .....**A3870 Avena fatua - Bromus spp. Ruderal Annual Grassland Alliance**
- A6b.** This alliance consists of meadows dominated by non-native forbs such as *Brassica nigra* (black mustard) and other mustards, *Raphanus* (radish) spp., *Hirschfeldia incana* (shortpod mustard) and *Isatic tinctoria* (Dyer's Woad). This alliance occurs widely in California and it likely occurs north into Oregon. ....
- .....**A4214 Brassica nigra - Raphanus spp. Ruderal Annual Forb Meadow Alliance**



## 2.B.2 Temperate Grassland & Shrubland

### D022 - Western North American Grassland & Shrubland

**M1a.** Upland macrogroup of ruderal annual and perennial grasslands, meadows steppe and shrublands found on human-disturbed sites, and dominated by non-native (usually >90% relative cover) and generalist native species in temperate areas of U.S. (Rockies westward) and southwestern Canada. If shrub layer is mostly native, then a significant herbaceous layer (>10% cover) is present and strongly dominated by non-native species so that the natural understory cannot be determined (usually >90% relative cover non-native). If herbaceous cover < 10% then treat as sparse understory a natural type. .... **G4**

..... **M493 Western North American Ruderal Grassland & Shrubland**

**M1b.** Vegetation is not as above. Ruderal species may be present but vegetation is characterized by native shrubs, grasses, or forbs. .... **M2**

**M2a.** Foothill and montane macrogroup that occurs throughout the Central Rockies, from central and eastern Wyoming north and west into British Columbia and Alberta and is composed of shrub- and/or herbaceous-dominated stands forming shrublands, shrub-steppe, or grasslands. Characteristic shrubs include *Acer glabrum* (Rocky Mountain maple), *Amelanchier alnifolia* (Saskatoon serviceberry), *Holodiscus discolor* (oceanspray), *Menziesia ferruginea* (rusty menziesia), *Physocarpus malvaceus* (mallow ninebark), *Symphoricarpos albus* (common snowberry), *Symphoricarpos occidentalis* (western snowberry), and species of *Prunus* (plum), *Rhus* (sumac), *Ribes* (currant), *Rosa* (rose), *Rubus parviflorus* (thimbleberry), *Spiraea* (spirea), and *Vaccinium* (blueberry). The herbaceous layer is characterized by *Festuca idahoensis* (Idaho fescue), *Pseudoroegneria spicata* (bluebunch wheatgrass), and other cool-season graminoids. .... **G5**

..... **M048 Central Rocky Mountain Montane-Foothill Grassland & Shrubland**

**M2b.** Vegetation is not as above. .... **M3**

**M3a.** Montane shrubland macrogroup of the southern Rocky Mountains, Colorado Plateau and outcrops and canyon slopes in the western and southern Great Plains. Characterized by an open to dense shrub layer typically dominated by *Cercocarpus montanus* (alderleaf mountain-mahogany), *Purshia tridentata* (antelope bitterbrush), and/or *Quercus gambelii* (Gambel oak), and several other characteristic shrubs. .... **G7**

..... **M049 Southern Rocky Mountain Montane Shrubland\***

**M3b.** Montane and subalpine herbaceous macrogroup includes mesic meadows and drier grasslands in the western U.S. The low (<1 m) perennial graminoid layer has characteristic species *Danthonia intermedia* (timber oatgrass), *Danthonia parryi* (Parry's oatgrass), *Festuca arizonica* (Arizona fescue), *Festuca thurberi* (Thurber's fescue), and *Muhlenbergia montana* (mountain muhly) in montane and subalpine grasslands in the southern Rocky Mountains. Dominant mesic meadow species include *Achillea millefolium* (common yarrow), *Calamagrostis breweri* (shorthair reedgrass), *Carex spectabilis* (showy sedge), *Carex stramineiformis* (Shasta sedge), *Chamerion angustifolium* (fireweed), *Elymus trachycaulus* (slender wheatgrass), *Erigeron speciosus* (aspen fleabane), *Festuca viridula* (greenleaf fescue), *Lupinus latifolius* (broadleaf lupine), *Phleum alpinum* (alpine timothy), *Senecio hydrophiloides* (tall groundsel), *Senecio serra* (tall ragwort), *Solidago canadensis* (Canada goldenrod), *Symphyotrichum* (aster) spp., *Thalictrum occidentale* (western meadowrue), and *Zigadenus elegans* (mountain deathcamas). .... **G8**

..... **M168 Rocky Mountain-Vancouverian Subalpine-High Montane Mesic Meadow\***

### M493 Western North American Ruderal Grassland & Shrubland

**G4a.** This group includes ruderal shrublands and grasslands dominated by the non-native grass *Elymus repens* and other non-native grasses and shrubs and is found in disturbed valley bottoms, alluvial flats, fans and lower valley wall sites in western Colorado and northwestern Montana and elsewhere in the western US. .... **A9**

#### **G624 Western North American Interior Ruderal Grassland & Shrubland Group**

**G4b.** This group is dominated by non-native invasive shrub or herbaceous species, such as *Agrostis capillaris* (colonial bentgrass), *Anthoxanthum odoratum* (sweet vernalgrass), *Cytisus scoparius* (Scotch broom), *Rubus armeniacus* (Himalayan blackberry), or many other introduced species, generally occurring on disturbed land throughout Pacific coastal areas below approximately 1500 m (5000 feet) in elevation. Not reported from NBR so no alliances are provided. ....

#### **G648 Southern Vancouverian Lowland Ruderal Grassland & Shrubland Group\***

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

#### M048 Central Rocky Mountain Montane-Foothill Grassland & Shrubland

- G5a.** This is a dry Central Rocky Mountain shrubland group is dominated by shrubs *Amelanchier alnifolia* (Saskatoon serviceberry), *Holodiscus discolor* (oceanspray), *Physocarpus malvaceus* (mallow ninebark), *Prunus emarginata* (bitter cherry), *Prunus virginiana* (chokecherry), *Rhus glabra* (smooth sumac), *Rosa nutkana* (Nootka rose), *Rosa woodsii* (Woods' rose), *Symphoricarpos albus* (common snowberry), and/or *Symphoricarpos oreophilus* (mountain snowberry). Understory grasses and forbs are common. Stands occur across the western U.S. and Canada within the matrix of surrounding low-elevation grasslands and sagebrush shrublands of low to mid elevations of the Rocky Mountains. ....**A11**  
..... **G272 Central Rocky Mountain Montane-Foothill Deciduous Shrubland**
- G5b.** Vegetation is not as above. Stands are typically grasslands or meadows dominated by herbaceous species, sometimes with low shrubs such as *Arctostaphylos uva-ursi*, *Dasiphora fruticosa* ssp. *floribunda*, and *Rosa nutkana* present to codominant. ....**G6**
- G6a.** This central Rocky Mountains grassland group occurs in an upper montane to subalpine zone and is dominated by perennial grasses, particularly *Achnatherum nelsonii* (Columbia needlegrass), *Festuca idahoensis* (Idaho fescue), and *Leucopoa kingii* (spike fescue), with many other graminoid and forb species present to codominant.....**A14**  
..... **G267 Central Rocky Mountain Montane Grassland**
- G6b.** This wide-ranging lower montane, foothill and valley grassland group is found in the central Rocky Mountains and extends north onto the Okanagan and Fraser plateaus, the valleys around the Fraser, Nicola, and Similkameen rivers in British Columbia, and foothills in Alberta and is dominated by cool-season perennial bunchgrasses, such as *Festuca campestris* (rough fescue), *Festuca idahoensis* (Idaho fescue), and *Pseudoroegneria spicata* (bluebunch wheatgrass) with diverse forbs (>25% cover) and sometimes a sparse (<10% cover) shrub layer. ....**A16**  
..... **G273 Central Rocky Mountain Lower Montane, Foothill & Valley Grassland**

#### M049 Southern Rocky Mountain Montane Shrubland

- G7a.** This relatively mesic shrubland group occurs in the mountains, plateaus and foothills of the southern Rocky Mountains and Colorado Plateau, and is typically dominated by *Quercus gambelii* (Gambel oak) alone or codominant with *Amelanchier alnifolia* (Saskatoon serviceberry), *Amelanchier utahensis* (Utah serviceberry), *Artemisia tridentata* (big sagebrush), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Fraxinus anomala* (singleleaf ash), *Prunus virginiana* (chokecherry), *Purshia stansburiana* (Stansbury cliffrose), *Purshia tridentata* (antelope bitterbrush), *Robinia neomexicana* (New Mexico locust), *Symphoricarpos oreophilus* (mountain snowberry), or *Symphoricarpos rotundifolius* (roundleaf snowberry). Also included are upland stands lacking *Quercus gambelii* (Gambel oak) that are dominated by *Amelanchier alnifolia* (Saskatoon serviceberry), *Amelanchier utahensis* (Utah serviceberry), *Ceanothus fendleri* (Fendler's ceanothus), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Fraxinus anomala* (singleleaf ash), *Prunus virginiana* (chokecherry), *Purshia stansburiana* (Stansbury cliffrose), *Purshia tridentata* (antelope bitterbrush), and/or *Robinia neomexicana* (New Mexico locust). ....**A22**  
..... **G277 Southern Rocky Mountain Gambel Oak - Mixed Montane Shrubland\***
- G7b.** This relatively dry foothills shrubland group occurs in the Rocky Mountains and Colorado Plateau from lower montane zone to canyons and breaks in the western Great Plains and is characterized by an open to closed shrub layer of nearly pure *Cercocarpus montanus* (alderleaf mountain-mahogany) or a mixed shrub layer with *Amelanchier utahensis* (Utah serviceberry), *Quercus x pauciloba*, *Purshia tridentata* (antelope bitterbrush), *Rhus trilobata* (skunkbush sumac), *Ribes cereum* (wax currant), or *Symphoricarpos oreophilus* (mountain snowberry).....**A25**  
..... **G276 Southern Rocky Mountain Mountain-mahogany - Mixed Foothill Shrubland\***

#### M168 Rocky Mountain-Vancouverian Subalpine-High Montane Mesic Meadow

- G8a.** This Rocky Mountain, northern Vancouverian and Sierran group is typically lush meadow dominated by a diversity of taller forbs, including *Achillea millefolium* (common yarrow), *Agastache urticifolia* (nettleleaf giant hyssop), *Balsamorhiza sagittata* (arrowleaf balsamroot), *Geranium viscosissimum* (sticky purple geranium), *Ligusticum* (licorice-root) spp., *Rudbeckia occidentalis* (western coneflower), *Thalictrum occidentale* (western meadowrue), *Valeriana sitchensis* (Sitka valerian), and *Xerophyllum tenax* (common beargrass), typically with grasses intermingled in many of them. However, it includes stands dominated by grasses with relatively broad and soft blades and a few mesic *Carices* (sedges) such as *Calamagrostis breweri* (shorthair reedgrass), *Carex filifolia* (threadleaf sedge), *Carex stramineiformis* (Shasta sedge), *Elymus*

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- trachycaulus* (slender wheatgrass), *Festuca viridula* (greenleaf fescue), and *Phleum alpinum* (alpine timothy). .....A28  
 .....G271 Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow
- G8b.** This southern Rocky Mountains grassland group typically occurs between 2200 and 3000 m elevation on flat to rolling plains and parks or on lower sideslopes that are dry, and is characterized by an open to dense perennial graminoid layer dominated by *Blepharoneuron tricholepis* (pine dropseed), *Danthonia intermedia* (timber oatgrass), *Danthonia parryi* (Parry's oatgrass), *Festuca arizonica* (Arizona fescue), *Festuca idahoensis* (Idaho fescue), *Festuca thurberi* (Thurber fescue), *Muhlenbergia filiculmis* (slimstem muhly), *Muhlenbergia montana* (mountain muhly), *Pascopyrum smithii* (western wheatgrass), *Poa lettermanii* (Letterman's bluegrass), *Poa nervosa* (Wheeler bluegrass), or *Pseudoroegneria spicata* (bluebunch wheatgrass). .....A36  
 ..... G268 Southern Rocky Mountain Montane-Subalpine Grassland

**G624 Western North American Interior Ruderal Grassland & Shrubland Group**

- A9a.** This ruderal alliance occurs in disturbed dry to mesic meadows found in lowland, montane and subalpine elevations (sea level to 3600 m) throughout the western U.S. and Canada. Vegetation is characterized by dominance of non-native forbs such as *Rumex crispus* (curly dock). .....  
 ..... A4191 *Rumex crispus* - (other FAC & Dryland Forb Species) Ruderal Meadow Alliance\*
- A9b.** This vegetation is dominated by non-native grasses rather than non-native forbs .....A10

- A10a.** This ruderal alliance is dominated by the non-native grass *Elymus repens* (quackgrass) and is known from disturbed valley bottoms, alluvial flats, fans and lower valley wall sites in western Colorado and northwestern Montana and likely occurs elsewhere in the western US.....A2658 *Elymus repens* Ruderal Grassland Alliance\*

- A10b.** This ruderal alliance occurs in disturbed, dry to mesic grasslands and meadows found at lowland, montane and subalpine elevations (sea level to 3600 m) throughout the western U.S. and Canada. Vegetation can be a monoculture of a single non-native graminoid species, or a mix of several non-native forbs and graminoids. Graminoids include *Agropyron cristatum* (crested wheatgrass) and *Bromus inermis* (smooth brome) (which has been purposefully seeded to prevent soil erosion), as well as many introduced forage species, especially in more mesic montane uplands such as *Alopecurus pratensis* (meadow foxtail), *Dactylis glomerata* (orchardgrass), *Phleum pratense* (timothy), *Poa pratensis* (Kentucky bluegrass), and *Psathyrostachys juncea* (Russian wildrye). Highly invasive and wind- and animal-dispersed, non-native forb species include *Sisymbrium altissimum* (tall tumbled mustard), *Descurainia sophia* (herb sophia), and *Lappula occidentalis* (flatspine stickseed). .....  
 A3254 *Agropyron cristatum* - *Bromus inermis* - *Poa pratensis* Ruderal Grassland Alliance\*

**G272 Central Rocky Mountain Montane-Foothill Deciduous Shrubland**

- A11a.** This shrubland alliance is characterized by the dominance of *Amelanchier alnifolia* (Saskatoon serviceberry) and is found in the lower montane and foothill regions around the northern Great Basin, Columbia Basin and central Rocky Mountains. ....  
 A3963 *Amelanchier alnifolia* Central Rocky Mountain Montane-Foothill Shrubland Alliance
- A11b.** Vegetation is not as above. *Amelanchier alnifolia* (Saskatoon serviceberry) is absent or has low cover. ....A12

- A12a.** This shrubland alliance is characterized by a sparse to moderately dense shrub layer dominated by *Rhus glabra* (smooth sumac) or *Rhus trilobata* (skunkbush sumac) with a sparse to moderately dense herbaceous layer composed of grasses such as *Aristida purpurea* (purple threeawn), *Festuca idahoensis* (Idaho fescue), and *Pseudoroegneria spicata* (bluebunch wheatgrass). It is found in the lower montane and foothill regions around the Columbia Basin, including river canyons, and extends north and east into the Central Rockies and to the foothills and breaks in the western Great Plains. ....  
 ... A3964 *Rhus glabra* - *Rhus trilobata* Central Rocky Mountain Montane-Foothill Shrubland Alliance

- A12b.** Vegetation is not as above. *Rhus glabra* (smooth sumac) or *Rhus trilobata* (skunkbush sumac) are absent or have low cover.....A13

- A13a.** This shrubland alliance is dominated by *Rosa nutkana* (Nootka rose) with an herbaceous layer dominated by *Deschampsia caespitosa* (tufted hairgrass) or *Oenanthe sarmentosa* (water parsley). It is found in the mountains of Oregon at montane elevations.....  
 ..... A3967 *Rosa nutkana* Central Rocky Mountain Shrubland Alliance

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

**A13b.** This mesic shrubland alliance is dominated by diagnostic species *Physocarpus malvaceus* (mallow ninebark), *Rosa acicularis* (prickly rose), *Rosa nutkana* (Nootka rose), *Rosa woodsii* (Woods' rose), and/or *Symphoricarpos albus* (common snowberry). It is known from canyons of the northern Wallowa Mountains, Imnaha River, and Snake River within the Columbia Plateau, the foothills and plains of the central Rocky Mountains and ranges in the Great Basin and eastern California.....  
 .....**A3975 Physocarpus malvaceus - Symphoricarpos albus Mesic Shrubland Alliance**

**G267 Central Rocky Mountain Montane Grassland**

**A14a.** This alliance is characterized by a sparse to moderately dense herbaceous layer dominated by diagnostic graminoid *Leucopoa kingii* (spike fescue) with *Carex elynoides* (blackroot sedge), *Oxytropis campestris* (field locoweed), *Phlox pulvinata* (cushion phlox), or *Poa fendleriana ssp. fendleriana* (muttongrass) present to codominant. It occurs on windward exposures on broad, gentle alpine slopes and ridges of the Challis Volcanics and Beaverhead Mountains in east-central Idaho and similar high subalpine sites in northwestern Wyoming....  
 .....**A1323 Leucopoa kingii - Carex elynoides - Phlox pulvinata Central Rocky Mountain Subalpine-Alpine Grassland Alliance**

**A14b.** Vegetation is not as above. *Leucopoa kingii* is absent or has low cover.....**A15**

**A15a.** This alliance is characterized by a sparse to moderately dense herbaceous layer dominated by the diagnostic perennial bunchgrass *Festuca idahoensis* (Idaho fescue) with *Carex obtusata* (obtusate sedge), *Carex scirpoidea* (northern singlespike sedge), *Danthonia intermedia* (timber oatgrass), *Eriogonum caespitosum* (matted buckwheat), *Leucopoa kingii* (spike fescue), or *Potentilla diversifolia* (varileaf cinquefoil) codominating. It is described from dry and often rocky subalpine and lower alpine slopes exposed to desiccating winds in the central Rocky Mountains of central and southern Idaho, western and south-central Montana, and northwestern Wyoming.....  
 ..... **A3965 Festuca idahoensis - Carex scirpoidea - Danthonia intermedia Central Rocky Mountain Subalpine Dry Grassland Alliance**

**A15b.** This alliance is characterized by a moderately dense to dense and diverse herbaceous layer dominated by medium-tall perennial graminoids *Achnatherum nelsonii* (Columbia needlegrass), *Calamagrostis rubescens* (pinegrass), *Carex hoodii* (Hood's sedge), *Deschampsia caespitosa* (tufted hairgrass), or *Festuca idahoensis* (Idaho fescue) with *Achnatherum richardsonii* (Richardson's needlegrass), *Carex filifolia* (threadleaf sedge), *Elymus trachycaulus* (slender wheatgrass), *Koeleria macrantha* (prairie Junegrass), or perennial forb *Lupinus sericeus* (silky lupine) present to codominant. It is described from relatively mesic sites on montane slopes in the central Rocky Mountains of central and southern Idaho, western and south-central Montana, eastern Oregon, Washington and northwestern Wyoming.....  
**A3966 Festuca idahoensis - Calamagrostis rubescens - Achnatherum nelsonii Central Rocky Mountain Montane Mesic Grassland Alliance**

**G273 Central Rocky Mountain Lower Montane, Foothill & Valley Grassland**

**A16a.** This alliance is characterized by a sparse to moderately dense herbaceous layer dominated by the medium-tall perennial graminoid *Elymus lanceolatus* (thickspike wheatgrass) with *Hesperostipa comata* (needle-and-thread) or *Phacelia hastata* (silverleaf phacelia) present to codominant and occurs in the Centennial Valley Sandhills in southwestern Montana, a high and cold valley on open, sandy flats in the Columbia River plains.....  
 ..... **A3985 Elymus lanceolatus - Hesperostipa comata - Phacelia hastata Central Rocky Mountain Sand Deposit Grassland Alliance**

**A16b.** Vegetation is not as above. *Elymus lanceolatus* (thickspike wheatgrass) is absent or has low cover. .... **A17**

**A17a.** Vegetation is characterized by an open to dense, usually patchy dwarf-shrub layer dominated by *Arctostaphylos uva-ursi* (kinnikinnick) or an open to moderately dense short-shrub layer dominated by *Dasiphora fruticosa ssp. floribunda* (shrubby-cinquefoil). ..... **A18**

**A17b.** Vegetation is characterized by herbaceous cover ranging from 60-100% codominated by diagnostic perennial bunchgrasses *Festuca campestris* (rough fescue), *Festuca idahoensis* (Idaho fescue), *Pseudoroegneria spicata* (bluebunch wheatgrass), and/or *Poa secunda* (Sandberg bluegrass). Shrubs are typically absent or present with low cover. .... **A19**

**A18a.** This central Rocky Mountain alliance is characterized by an open to dense, usually patchy dwarf-shrub layer dominated by *Arctostaphylos uva-ursi* (kinnikinnick) with a sparse to



moderately dense cover of perennial graminoids dominated by *Festuca campestris* (rough fescue), *Festuca idahoensis* (Idaho fescue), or *Pseudoroegneria spicata* (bluebunch wheatgrass). It occurs in the subalpine and lower alpine zones mountains of northwestern Montana and southwestern Alberta. ....

.... **A4095 *Arctostaphylos uva-ursi* / *Festuca* spp. - *Pseudoroegneria spicata* Steppe Alliance**

**A18b.** This small-patch, shrub-steppe alliance is characterized by an open to moderately dense short-shrub layer dominated by diagnostic species *Dasiphora fruticosa* ssp. *floribunda* (shrubby-cinquefoil) and a moderate to dense herbaceous layer dominated by medium-tall perennial bunchgrasses *Festuca campestris* (rough fescue) and *Festuca idahoensis* (Idaho fescue). It occurs infrequently in the central Rocky Mountains and the northwestern Great Plains. ....

**A4096 *Dasiphora fruticosa* ssp. *floribunda* / *Festuca campestris* - *Festuca idahoensis* Shrub-steppe Alliance**

**A19a.** Vegetation of this mesic grassland alliance is characterized by herbaceous cover ranging from 60-100% codominated by diagnostic perennial bunchgrasses *Festuca campestris* (rough fescue) and *Festuca idahoensis* (Idaho fescue). It occurs in the northwestern Great Plains west into the central Rocky Mountains, including the Blue Mountains of eastern Oregon and Washington. Some stands may extend up to montane and subalpine elevations. ....

..... **A3986 *Festuca campestris* - *Festuca idahoensis* Mesic Grassland Alliance**

**A19b.** Vegetation is not as above. *Festuca campestris* (rough fescue) is absent or has low cover...

**A20a.** This alliance is characterized by *Pseudoroegneria spicata* (bluebunch wheatgrass), *Festuca idahoensis* (Idaho fescue), and/or *Hesperostipa comata* (needle-and-thread) dominating the midgrass layer and occurs in remnants of the Palouse Prairie of southeastern Washington, Oregon and Idaho. ....

..... **A3989 *Festuca idahoensis* - *Pseudoroegneria spicata* Palouse Grassland Alliance**

**A20b.** Vegetation is not as above. Stands do not occur in remnants of the Palouse Prairie of southeastern Washington, Oregon and Idaho. .... **A21**

**A21a.** This widespread dry grassland alliance is characterized by an open to moderately dense herbaceous layer dominated by diagnostic perennial bunchgrasses *Festuca idahoensis* (Idaho fescue), *Pseudoroegneria spicata* (bluebunch wheatgrass), and/or *Poa secunda* (Sandberg bluegrass) and occurs in the northwestern Great Plains, central Rocky Mountains and interior Pacific Northwest. ....

. **A3987 *Festuca idahoensis* - *Pseudoroegneria spicata* - *Poa secunda* Dry Grassland Alliance**

**A21b.** This mesic grassland alliance is characterized by an open to moderately dense herbaceous layer dominated by diagnostic perennial grass *Festuca idahoensis* (Idaho fescue) or *Pseudoroegneria spicata* (bluebunch wheatgrass) with mesic-site indicator species *Bromus marginatus* (mountain brome), *Elymus lanceolatus* (thickspike wheatgrass), *Koeleria macrantha* (prairie Junegrass), or *Pascopyrum smithii* (western wheatgrass) and is found primarily east of the Continental Divide in foothills in northwestern Montana. ....

**A3988 *Festuca idahoensis* - *Pseudoroegneria spicata* - *Pascopyrum smithii* Mesic Grassland Alliance**

#### **G277 Southern Rocky Mountain Gambel Oak - Mixed Montane Shrubland**

**A22a.** This mixed shrub alliance occupies talus, scree, rock outcrop and steep to moderate colluvial slope sites of the southern Rocky Mountains and plateaus of the Colorado Plateaus and extends into ranges in the Great Basin. Vegetation is often patchy and variable and is dominated by *Brickellia californica* (California brickellbush), *Fraxinus anomala* (singleleaf ash), *Fendlera rupicola* (cliff fendlerbush), *Jamesia americana* (fivepetal cliffbush), *Prunus virginiana* (chokecherry), and/or *Rhus trilobata* (skunkbush sumac). ....

..... **A3736 *Fraxinus anomala* - *Rhus trilobata* - *Fendlera rupicola* Talus & Rock Outcrop Shrubland Alliance\***

**A22b.** Shrublands dominated by other shrub species or if dominated by *Brickellia californica* (California brickellbush), *Fraxinus anomala* (singleleaf ash), *Fendlera rupicola* (cliff fendlerbush), *Jamesia americana* (fivepetal cliffbush), *Prunus virginiana* (chokecherry), and/or *Rhus trilobata* (skunkbush sumac), then vegetation does not occupy talus, scree, rock outcrop and steep to moderate colluvial slope sites. .... **A23**

**A23a.** This alliance is characterized by shrubland and shrub-steppe vegetation where the dominant shrub is *Ceanothus fendleri* (Fendler's ceanothus). It is described from Bandelier National Monument in north-central New Mexico and Grand Canyon National Park in

northern Arizona and likely occurs elsewhere in the southern Rocky Mountains and Colorado Plateau. .... **A3737 Ceanothus fendleri Shrubland & Shrub-Steppe Alliance\***  
**A23b.** *Quercus gambelii* (Gambel oak), and/or *Robinia neomexicana* (New Mexico locust), *Fallugia paradoxa* (Apache plume), *Ribes cereum* (wax currant), or *Rhus trilobata* (skunkbush sumac)..... **A24**

**A24a.** This alliance of north-central New Mexico and the Mogollon Rim in north-central Arizona is characterized by shrublands dominated or codominated by *Robinia neomexicana* (New Mexico locust) with *Quercus gambelii* (Gambel oak) often present to codominant. ....  
 ..... **A3738 Quercus gambelii - Robinia neomexicana Shrubland Alliance\***

**A24b.** This alliance occurs in the southern Rocky Mountains and Colorado Plateau and extends into the southern Great Basin. It is characterized by dominance or codominance of *Quercus gambelii* (Gambel oak) in association with other mid-elevation shrubs and includes mesic upland stands of *Rhus trilobata* (skunkbush sumac).....  
 ..... **A3735 Quercus gambelii - Symphoricarpos oreophilus Shrubland Alliance\***

**G276 Southern Rocky Mountain Mountain-mahogany - Mixed Foothill Shrubland**

**A25a.** This alliance is characterized by short, open shrublands occupying lava flows of El Malpais National Monument dominated by *Fallugia paradoxa* (Apache plume), *Ribes cereum* (wax currant), or *Rhus trilobata* (skunkbush sumac) singly or in combination. It may in similar environments elsewhere in the interior western US. ....  
 ..... **A3730 Fallugia paradoxa - Rhus trilobata Shrubland Alliance\***

**A25b.** Vegetation is not as above. .... **A26**

**A26a.** This alliance is characterized by shrublands of the eastern Front Range of Colorado within canyons dominated by *Purshia tridentata* (antelope bitterbrush) or *Ribes cereum* (wax currant). ....  
 ..... **A3731 Purshia tridentata - Ribes cereum Shrubland Alliance\***

**A26b.** Vegetation is not as above. Shrublands dominated by *Amelanchier utahensis* (Utah serviceberry), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Cercocarpus intricatus* (littleleaf mountain mahogany), and/or *Quercus x pauciloba* (Wavyleaf Oak). .... **A27**

**A27a.** This alliance is characterized by shrublands dominated or codominated by *Cercocarpus montanus* (alderleaf mountain-mahogany) and/or *Quercus x pauciloba* (Wavyleaf Oak) occurring in the southern Rocky Mountains south to the northern Chihuahuan Desert and east to the Southern Shortgrass Prairie with outlying occurrences in adjacent ecoregions. ....  
 ..... **A3733 Cercocarpus montanus - Quercus x pauciloba Shrubland Alliance\***

**A27b.** This alliance is characterized by shrublands dominated by *Amelanchier utahensis* (Utah serviceberry), *Cercocarpus montanus* (alderleaf mountain-mahogany) or *Cercocarpus intricatus* (littleleaf mountain mahogany) in the southern Rocky Mountains, Wyoming Basins, Colorado Plateau and extending west into the Great Basin. ....  
 .. **A3732 Amelanchier utahensis - Cercocarpus montanus - Cercocarpus intricatus Shrubland Alliance\***

**G271 Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow**

**A28a.** This mesic meadow alliance is dominated by graminoids *Poa secunda* (Sandberg bluegrass), *Muhlenbergia richardsonis* (mat muhly), *Poa cusickii* (Cusick's bluegrass), and/or *Carex douglasii* (Douglas' sedge) and found in deep-soil, moist meadows at low to high elevations throughout the interior of the western U.S. ....  
 .. **A4165 Poa secunda - Muhlenbergia richardsonis - Carex douglasii Moist Meadow Alliance**

**A28b.** Vegetation is not as above. *Poa secunda* (Sandberg bluegrass), *Muhlenbergia richardsonis* (mat muhly), *Poa cusickii* (Cusick's bluegrass), and/or *Carex douglasii* (Douglas' sedge) are typically absent or have low cover. .... **A29**

**A29a.** This montane mesic meadow alliance is characterized by the dominance of *Carex stramineiformis* (Shasta Sedge) or *Solidago canadensis* (Canada goldenrod) in California and Nevada. .... **A4119 Carex stramineiformis - Solidago canadensis Meadow Alliance**

**A29b.** Vegetation is not as above. *Carex stramineiformis* (Shasta Sedge) or *Solidago canadensis* (Canada goldenrod) are typically absent or have low cover. .... **A30**

**A30a.** Vegetation is montane mesic meadows that may extend down into the upper foothills. Dominant species include *Agastache urticifolia* (nettleleaf giant hyssop), *Geranium viscosissimum* (sticky purple geranium), *Heliomeris multiflora* (showy goldeneye), *Ligusticum*

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.



- filicinum* (fernleaf licorice-root), *Ligusticum porteri* (Porter's licorice-root), *Ligusticum tenuifolium* (Idaho licorice-root), *Lupinus argenteus* (silvery lupine), or *Lupinus parviflorus* ssp. *myrianthus* (lodgepole lupine), *Mertensia ciliata* (tall fringed bluebells), *Pteridium aquilinum* (western brackenfern), or *Wyethia amplexicaulis* (mule-ears). *Ligusticum filicinum* (fernleaf licorice-root), *Ligusticum porteri* (Porter's licorice-root), *Ligusticum tenuifolium* (Idaho licorice-root), *Lupinus argenteus* (silvery lupine), or *Lupinus parviflorus* ssp. *myrianthus* (lodgepole lupine). .....**A31**
- A30b.** Vegetation is subalpine/alpine grasslands, meadow or turf characterized by *Agrostis variabilis* (mountain bentgrass), *Calamagrostis* spp. (reedgrass), *Carex filifolia* (threadleaf sedge), *Elymus trachycaulus* (slender wheatgrass), or *Phleum alpinum* (alpine timothy).....**A32**
- A31a.** This montane mesic meadow alliance is characterized by the dominance of *Agastache urticifolia* (nettleleaf giant hyssop), *Geranium viscosissimum* (sticky purple geranium), *Heliomeris multiflora* (showy goldeneye), *Mertensia ciliata* (tall fringed bluebells), *Pteridium aquilinum* (western brackenfern), or *Wyethia amplexicaulis* (mule-ears). Stands occur in the central Rocky Mountains of Wyoming, Utah and Idaho extending west to ranges in Nevada....  
**A3950 Agastache urticifolia - Geranium viscosissimum - Pteridium aquilinum Montane Mesic Meadow Alliance**
- A31b.** This montane mesic meadow alliance is characterized by the dominance of diagnostic species *Ligusticum filicinum* (fernleaf licorice-root), *Ligusticum porteri* (Porter's licorice-root), *Ligusticum tenuifolium* (Idaho licorice-root), *Lupinus argenteus* (silvery lupine), or *Lupinus parviflorus* ssp. *myrianthus* (lodgepole lupine). Stands occur in the central Rocky Mountains of Wyoming and Idaho extending south to ranges in Colorado.....  
**A3951 Ligusticum spp. - Lupinus spp. - Delphinium spp. Montane Mesic Meadow Alliance\***
- A32a.** This high-elevation alliance is dominated by *Carex filifolia* (threadleaf sedge) and forms closed to open turf. This dry subalpine short grassland and alpine meadow occurs on slopes and ridges from 1500-3700 m elevation in the Sierra Nevada of California and possibly east into the mountain ranges of western Nevada.....  
.....**A1257 Festuca viridula - Carex hoodii - Lupinus spp. Subalpine Mesic Meadow Alliance**
- A32b.** Vegetation is not as above. *Festuca viridula* (greenleaf fescue) is typically absent or has low cover. ....**A33**
- A33a.** This high-elevation alliance is dominated by *Carex filifolia* (threadleaf sedge) that grows in tight clumps that form closed to open turf. This is a short grassland of dry subalpine and alpine meadows occurs on slopes and ridges from 1500-3700 m elevation in the Sierra Nevada of California and possibly east into the mountain ranges of western Nevada. ....  
..... **A1294 Carex filifolia Mesic Grassland Alliance**
- A33b.** Vegetation is not as above. *Carex filifolia* (threadleaf sedge) is typically absent or has low cover. ....**A34**
- A34a.** This high-elevation alliance consists of meadows where *Calamagrostis breweri* (shorthair reedgrass) or *Calamagrostis muiriana* (reedgrass) is an important or dominant grass. This alpine and subalpine grassland is found in the Sierra Nevada of California at elevations ranging from 1300-1800 m and occurs on fine-textured soils which are moist for most of the year, often on stream and lake margins.....  
..... **A3364 Calamagrostis breweri Mesic Grassland Alliance**
- A34b.** Vegetation is not as above. *Calamagrostis breweri* (shorthair reedgrass) and *Calamagrostis muiriana* (reedgrass) are typically absent or have low cover.....**A35**
- A35a.** This high elevation meadow alliance is characterized by a moderately dense and diverse herbaceous layer with one or more of several diagnostic species to abundant such as *Carex geyeri* (Geyer's sedge), *Carex spectabilis* (showy sedge), *Chamerion angustifolium* (fireweed), *Erythronium grandiflorum* (yellow avalanche-lily), *Ligusticum grayi* (Gray's licorice-root), *Luzula glabrata* var. *hitchcockii* (Hitchcock's smooth woodrush), *Sanguisorba officinalis* (great burnet), *Valeriana sitchensis* (Sitka valerian), *Veratrum viride* (green false hellebore), and *Xerophyllum tenax* (common beargrass). It is found in subalpine meadows in the central Rocky Mountains and extends west into the Olympic Mountains and Cascade Range.....  
**A3948 Valeriana sitchensis - Luzula glabrata var. hitchcockii - Xerophyllum tenax Subalpine Mesic Meadow Alliance**
- A35b.** This high-elevation alliance occurs in the upper subalpine to lower alpine mesic meadows and is characterized by the dominance of *Phleum alpinum* (alpine timothy), *Elymus trachycaulus* (slender wheatgrass), or *Agrostis variabilis* (mountain bentgrass). Stands occur

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in the central Rocky Mountains of Wyoming, Utah and Idaho extending west to ranges in Nevada.....  
..... **A3949 Phleum alpinum - Elymus trachycaulus - Agrostis variabilis Subalpine Mesic Meadow Alliance**

**G268 Southern Rocky Mountain Montane-Subalpine Grassland**

**A36a.** This grassland alliance is characterized by an open to dense perennial graminoid layer composed of bunchgrasses *Festuca arizonica* (Arizona fescue) and *Muhlenbergia montana* (mountain muhly), which are widespread dominants. It occurs largely in the southern Rocky Mountains extending west to the mountains and high plateaus of Arizona, Utah and Nevada and northeast to the Black Hills. Stands occur primarily in the montane zone (2440-3050 m [8000-10,000 feet]), but may extend down into the foothills.....  
.....**A3953 Festuca arizonica - Muhlenbergia montana - Poa fendleriana Southern Rocky Mountain Montane Grassland Alliance\***

**A36b.** This grassland alliance is characterized by an open to dense perennial graminoid layer composed of bunchgrasses, especially *Festuca thurberi* (Thurber fescue) and *Danthonia intermedia* (timber oatgrass), with other diagnostic and sometimes dominant species that include *Festuca idahoensis* (Idaho fescue), *Poa lettermanii* (Letterman's bluegrass), and *Poa nervosa* (Wheeler bluegrass). It occurs largely in the southern Rocky Mountains extending west to the high plateaus and mountains of Arizona, Utah and Nevada primarily in the subalpine zone (10, 000-11,500 feet).....  
**A3954 Festuca thurberi - Danthonia intermedia - Poa lettermanii Southern Rocky Mountain Subalpine Grassland Alliance**

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\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

## D61 Western North American Interior Chaparral

**M1a.** This warm interior chaparral macrogroup is centered in mountains in northern Mexico and extends north to central Arizona (Mogollon Rim), southern New Mexico and Trans-Pecos Texas, and west into Sonoran and Mojave desert ranges. Stands are composed of a diverse list of diagnostic, mostly evergreen shrubs such as *Adenostoma sparsifolium* (redshank), *Arctostaphylos pungens* (pointleaf manzanita), *Arctostaphylos pringlei* (Pringle's manzanita), *Ceanothus greggii* (desert ceanothus), *Cercocarpus montanus* var. *glaber* (birchleaf mountain-mahogany), *Eriogonum fasciculatum* (Eastern Mojave buckwheat), *Fremontodendron californicum* (California flannelbush), *Juniperus californica* (California juniper), *Quercus cornelius-mulleri* (Muller oak), or *Quercus john-tuckeri* (Tucker oak)..... **G2**  
..... **M091 Warm Interior Chaparral\***

**M1b.** This cool interior chaparral macrogroup is centered the interior western U.S. and is composed of cold-hardy dominant and diagnostic species *Arctostaphylos glandulosa* (Eastwood's manzanita), *Arctostaphylos nevadensis* (pinemat manzanita), *Arctostaphylos patula* (greenleaf manzanita), *Ceanothus cordulatus* (whitethorn ceanothus), *Ceanothus diversifolius* (pinemat), *Ceanothus integerrimus* (deerbrush), *Ceanothus pinetorum* (Coville ceanothus), *Ceanothus sanguineus* (redstem ceanothus) (in Oregon), *Ceanothus velutinus* (snowbrush ceanothus), *Chrysolepis sempervirens* (bush chinquapin), *Garrya flavescens* (ashy silttassel), *Holodiscus discolor* (oceanspray), *Prunus emarginata* (bitter cherry), *Prunus subcordata* (Klamath plum), *Purshia stansburiana* (Stansbury cliffrose), *Quercus garryana* var. *breweri* (Oregon white oak), *Quercus sadleriana* (deer oak), *Quercus vacciniifolia* (huckleberry oak), and *Rhus trilobata* (skunkbush sumac). ..... **G3**  
..... **M094 Cool Interior Chaparral**

## M091 Warm Interior Chaparral

**G2a.** This chaparral group is found across the southwestern U.S. from central New Mexico and southern Utah west to California and is characterized by a moderate to dense evergreen shrub layer dominated by sclerophyllous shrubs, especially *Adenostoma sparsifolium* (redshank), *Arctostaphylos pungens* (pointleaf manzanita), *Ceanothus greggii* (desert ceanothus), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Fremontodendron californicum* (California flannelbush), *Garrya wrightii* (Wright's silttassel), *Juniperus californica* (California juniper), *Mortonia utahensis* (Utah mortonia), *Quercus cornelius-mulleri* (Muller oak), *Quercus john-tuckeri* (Tucker oak), and *Quercus turbinella* (Sonoran scrub oak), that occurs in foothills, xeric mountain slopes and canyons. .... **A10**  
..... **G281 Western Madrean Chaparral\***

**G2b.** This chaparral group occurs in the Madrean Oriental in northern Mexico and desert mountains across Trans-Pecos Texas and is characterized by a moderate to dense shrub canopy dominated by evergreen shrub oak species *Quercus intricata* (dwarf oak), *Quercus laceyi* (Lacey oak), *Quercus pungens* (pungent oak), *Quercus vaseyana* (sandpaper oak), and other chaparral species such as *Acacia roemeriana* (roundflower catclaw), *Ceanothus greggii* (desert ceanothus), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Fallugia paradoxa* (Apache plume), *Fendlera rigida* (stiff fendlerbush), *Fraxinus greggii* (Gregg's ash), *Garrya ovata* (eggleaf silttassel), *Garrya wrightii* (Wright's silttassel), *Juniperus pinchotii* (Pinchot's juniper), *Purshia mexicana* (Mexican cliffrose), *Rhus virens* var. *choriophylla* (evergreen sumac), *Salvia lycioides* (canyon sage), *Salvia regla* (mountain sage), *Salvia roemeriana* (cedar sage), and *Sophora secundiflora* (mescal bean) that occur on foothills, mountain slopes and canyons.....  
..... **G280 Eastern Madrean Chaparral\***

## M094 Cool Interior Chaparral

**G3a.** This western North American group consists of montane chaparral scrublands dominated by a variety of species, including *Arctostaphylos patula* (greenleaf manzanita), *Arctostaphylos mewukka* (Indian manzanita), *Arctostaphylos nevadensis* (pinemat manzanita), *Arctostaphylos viscida* (sticky whiteleaf manzanita), *Ceanothus cordulatus* (whitethorn ceanothus), *Ceanothus velutinus* (snowbrush ceanothus), *Ceanothus integerrimus* (deerbrush), *Ceanothus martinii* (Martin's ceanothus), *Chrysolepis sempervirens* (bush chinquapin), *Holodiscus discolor* (oceanspray), *Prunus emarginata* (bitter cherry), *Quercus garryana* var. *breweri* (Oregon white oak), *Quercus sadleriana* (deer oak), and/or *Quercus vacciniifolia* (huckleberry oak). ..... **A4**  
**G282 Western North American Montane Sclerophyll Scrub**

**G3b.** There is only one Group within this Macrogroup.

## G282 Western North American Montane Sclerophyll Scrub

**A4a.** This alliance consists of scrublands dominated or codominated by *Arctostaphylos patula* (greenleaf manzanita) or *Arctostaphylos nevadensis* (pinemat manzanita). They are often

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- monotypic stands with few other shrubs. Other shrubs may be present to codominant such as *Artemisia tridentata* (big sagebrush), *Ceanothus cordulatus* (whitethorn ceanothus), *Ceanothus velutinus* (snowbrush ceanothus), *Ceanothus integerrimus* (deerbrush), or *Ceanothus martinii* (Martin's ceanothus). These montane shrublands occur on the eastern slope of the Sierra Nevada and into the western Great Basin and Colorado Plateau and are found mostly on steep, usually south-facing slopes, where soils are rocky and well-drained. ...  
..... **A0788 Arctostaphylos patula - Arctostaphylos nevadensis Shrubland Alliance**
- A4b.** Vegetation is not as above. *Arctostaphylos patula* (greenleaf manzanita) and *Arctostaphylos nevadensis* (pinemat manzanita) are absent or have low cover. ....**A5**
- A5a.** This widespread shrubland alliance is dominated or codominated by *Ceanothus velutinus* (snowbrush ceanothus). Other shrubs may be present to codominant such as *Artemisia tridentata* (big sagebrush) or *Prunus emarginata*. Mature stands have a uniform layer of tall shrubs 1-2 m in height. It occurs on montane slopes in the western U.S., including the Black Hills of South Dakota. .... **A3936 Ceanothus velutinus Shrubland Alliance**
- A5b.** Vegetation is not as above. *Ceanothus velutinus* (snowbrush ceanothus) is absent or has low cover. ....**A6**
- A6a.** This alliance consists of shrublands dominated or codominated by *Prunus emarginata* (bitter cherry) or *Holodiscus discolor* (oceanspray). Other shrubs may be present with lower cover including *Amelanchier alnifolia* (Saskatoon serviceberry), *Arctostaphylos patula* (greenleaf manzanita), *Artemisia tridentata* (big sagebrush), *Ceanothus cordulatus* (whitethorn ceanothus), *Ceanothus cuneatus* (buckbrush), *Ceanothus integerrimus* (deerbrush), *Ceanothus velutinus* (snowbrush ceanothus), *Cercocarpus ledifolius* (curl-leaf mountain-mahogany), *Garrya fremontii* (bearbrush), *Prunus andersonii* (desert peach), *Quercus sadleriana* (deer oak), and *Quercus vacciniifolia* (huckleberry oak). Stands are generally found between 700 and 2800 m elevation in California, but more common at higher elevations. It is widespread in montane to subalpine zones where it occurs on ridges, montane slopes, rocky chutes, moraines, and talus. ....**A7**  
..... **A3918 Prunus emarginata - Holodiscus discolor Shrubland Alliance**
- A6b.** Vegetation is not as above. *Prunus emarginata* (bitter cherry) or *Holodiscus discolor* (oceanspray) are absent or have low cover. ....
- A7a.** This shrubland alliance is dominated by either *Ceanothus cordulatus* (whitethorn ceanothus) or *Ceanothus integerrimus* (deerbrush), with other montane chaparral shrubs. This alliance occurs in cismontane California and mountains of southern Oregon. Stands occur on well-drained soils and are best developed on dry, exposed sites such as along ridges and upper slopes, between 300 and 2100 m elevation. ....  
..... **A3917 Ceanothus cordulatus - Ceanothus integerrimus Shrubland Alliance**
- A7b.** Vegetation is not as above. Vegetation is dominated by *Quercus* (oak) species. ....**A8**
- A8a.** This shrubland alliance is dominated by *Quercus vacciniifolia* (huckleberry oak) and/or *Chrysolepis sempervirens* (bush chinquapin). This alliance occurs from Oregon to the southern Sierra Nevada of California along ridges and upper slopes between 700 and 3300 m in elevation. .... **A3916 Quercus vacciniifolia - Chrysolepis sempervirens Shrubland Alliance**
- A8b.** Vegetation is not as above. *Quercus vacciniifolia* (huckleberry oak) and/or *Chrysolepis sempervirens* (bush chinquapin) are absent or have low cover. ....**A9**
- A9a.** This shrubland alliance is dominated by *Quercus sadleriana* (deer oak) and/or *Lithocarpus densiflorus* var. *echinoides* (tanoak). It is found in the Klamath-Siskiyou Mountains of southern Oregon and California, as well as along the foothills of the central Sierra Nevada. Stands commonly occur after disturbance from fire or logging along ridges and upper slopes between 600 and 3300 m elevation. ....  
..... **A4117 Quercus sadleriana - Lithocarpus densiflorus var. echinoides Shrubland Alliance**
- A9b.** This alliance consists of the shrub forms of *Quercus garryana* (Oregon white oak) where they are dominant or codominant with several other shrub species such as *Amelanchier* (serviceberry), *Arctostaphylos* (manzanita), *Ceanothus* (ceanothus), *Cercocarpus* (mountain mahogany), *Fraxinus* (ash), *Prunus* (plum), and/or shrubby forms of *Quercus* (oak). It occurs in the northern Coast Ranges, Klamath Mountains, Modoc Plateau, Sierra Nevada and foothills, and southern Cascades of California, and is likely to occur in Oregon. ....  
..... **A3919 Quercus garryana var. fruticosa Shrubland Alliance**

**G281 Western Madrean Chaparral**

**A10a.** Vegetation is dominated by chaparral species *Arctostaphylos pungens* (pointleaf manzanita), *Arctostaphylos pringlei* (Pringle's manzanita), *Ceanothus greggii* (desert ceanothus), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Eriogonum fasciculatum* (Eastern Mojave buckwheat) and/or *Mortonia utahensis* (Utah mortonia). .....**A11**

**A10b.** Vegetation is dominated by *Fremontodendron californicum* (California flannelbush), *Juniperus californica* (California juniper) and/or by oak species *Quercus turbinella* (Sonoran scrub oak), *Quercus cornelius-mulleri* (Muller oak), and *Quercus john-tuckeri* (Tucker oak).**A13**

**A11a.** This evergreen shrubland alliance is dominated or codominated by *Arctostaphylos pungens* (pointleaf manzanita), *Arctostaphylos pringlei* (Pringle's manzanita), *Ceanothus greggii* (desert ceanothus), and *Mortonia utahensis* (Utah mortonia). This chaparral alliance occurs from Nevada to New Mexico on dry mountain slopes ranging from 980-2470 m elevation depending on aspect. ....  
.....**A3790 Arctostaphylos pungens - Arctostaphylos pringlei - Ceanothus greggii Chaparral Alliance\***

**A11b.** Vegetation is dominated or codominated by *Cercocarpus montanus* (alderleaf mountain-mahogany). If present, *Arctostaphylos pungens* (pointleaf manzanita) and *Arctostaphylos pringlei* (Pringle's manzanita) have low cover.....**A12**

**A12a.** This alliance includes shrublands dominated by *Cercocarpus montanus* (alderleaf mountain-mahogany) in the Chihuahuan Desert of New Mexico, Arizona, and northern Mexico. Stands occur from foothill to lower montane elevational zones in desert mountain ranges and along the Mogollon Rim.....  
.....**A3791 Cercocarpus montanus Madrean Montane Chaparral Alliance\***

**A12b.** This shrubland alliance is characterized by the co-importance of *Cercocarpus montanus* var. *glaber* (birchleaf mountain-mahogany) and *Eriogonum fasciculatum* (Eastern Mojave buckwheat). This chaparral occurs in California's southern mountains and the western margins of the Mojave and Colorado deserts, and Baja California in a wide variety of habitats. ....  
.....**A3792 Cercocarpus montanus - Eriogonum fasciculatum - Adenostoma sparsifolium Western Mojave Desert Chaparral Alliance\***

**A13a.** This chaparral alliance includes evergreen shrublands dominated or codominated by *Quercus turbinella* (Sonoran scrub oak) that typically forms thickets with other shrubs. It is found on steep, rocky slopes in the mountains of Arizona, Nevada, New Mexico, and western Texas, often on sheltered slopes in limestone canyons. ....  
.....**A0793 Quercus turbinella Chaparral Alliance\***

**A13b.** This chaparral alliance is characterized by evergreen scrub oak species and other sclerophyllous shrubs with dominant and diagnostic species such as *Ceanothus greggii* (desert ceanothus), *Fremontodendron californicum* (California flannelbush), *Juniperus californica* (California juniper), *Quercus cornelius-mulleri* (Muller oak), or *Quercus john-tuckeri* (Tucker oak). It occurs from arid, interior southern California and adjacent Mojave and Colorado deserts.....  
...**A3793 Quercus john-tuckeri - Quercus cornelius-mulleri - Fremontodendron californicum Chaparral Alliance\***

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

### 3.B.1 Cool Semi-Desert Scrub & Grassland

#### D040 Western North American Cool Semi-Desert Scrub & Grassland

- M1a.** Upland macrogroup of ruderal semi-desert scrub and grasslands dominated by non-native (usually >90% relative cover) and generalist native species in cool semi-desert areas of U.S. Characteristic non-native species are *Acroptilon repens* (hardheads), *Agropyron cristatum* (crested wheatgrass), *Alhagi maurorum* (camelthorn), *Brassica nigra* (black mustard), *Bromus tectorum* (cheatgrass), *Bromus hordeaceus* (soft brome), *Bromus madritensis* (compact brome), *Cardaria draba* (whitetop), several *Centaurea* (knapweed/star-thistle) species, *Crupina vulgaris* (common crupina), *Cynoglossum officinale* (gypsyflower), *Cytisus striatus* (striated broom), *Euphorbia esula* (leafy spurge), *Halogeton glomeratus* (saltlover), *Hyoscyamus niger* (black henbane), *Hypericum perforatum* (common St. Johnswort), *Isatis tinctoria* (Dyer's woad), *Lepidium latifolium* (broadleaved pepperweed), *Linaria dalmatica* (Dalmatian toadflax), *Linaria vulgaris* (butter and eggs), *Peganum harmala* (harmal peganum) *Salsola tragus* (prickly Russian thistle), *Taeniatherum caput-medusae* (medusahead), and *Zygophyllum fabago* (Syrian beancaper). If shrub layer is mostly native (such as *Artemisia tridentata* (big sagebrush), *Atriplex confertifolia* (shadscale saltbush), *Chrysothamnus viscidiflorus* (yellow rabbitbrush), *Ericameria nauseosa* (rubber rabbitbrush), *Grayia spinosa* (spiny hopsage), and *Gutierrezia sarothrae* (broom snakeweed)), then a significant herbaceous layer (>10% cover) is present and strongly dominated by non-native species so that the natural understory cannot be determined (usually >90% relative cover non-native). If herbaceous cover < 10% then treat as a sparse understory natural type. ....G7  
..... **M499 Western North American Cool Semi-Desert Ruderal Scrub & Grassland**
- M1b.** Upland macrogroup of cool semi-desert scrub, dry grasslands, shrub steppe, shrublands, and sparse vegetation dominated by native species. If herbaceous understory is present, then not strongly dominated (>90% relative cover) by non-native species. ....M2
- M2a.** Macrogroup of shrublands along dry washes and valley floors, dominated by *Atriplex canescens* (fourwing saltbush), *Ericameria nauseosa* (rubber rabbitbrush), *Artemisia tridentata ssp. tridentata* (basin big sagebrush), *Atriplex canescens* (fourwing saltbush), *Atriplex confertifolia* (shadscale saltbush), *Brickellia* (brickellbush) spp., *Ephedra* (joint-fir) spp., *Ericameria nauseosa* (rubber rabbitbrush), and/or *Fraxinus anomala* (singleleaf ash). ....G8  
..... **M095 Great Basin-Intermountain Xeric-Riparian Scrub**
- M2b.** Upland semi-desert shrublands, scrub, dry grasslands and sparse vegetation dominated by native species. ....M3
- M3a.** Macrogroup where vegetation is controlled by lithography, such as cliffs, scree and badlands. Vascular plant cover is generally low (<10%), often patchy with up to 15% total cover in some areas. Many of the characteristic species also occur in non-sparse vegetation macrogroups, although some of the sites with harsh soil properties (badlands) may have endemic species. Characteristic trees or shrubs include species of *Artemisia* (sagebrush), *Atriplex* (saltbush), *Cercocarpus* (mountain mahogany), *Eriogonum* (buckwheat), *Fallugia*, *Grayia*, *Juniperus* (juniper), *Pinus* (pine), *Purshia* (bitterbrush), and others. Variety of landscapes / exposed rock and badland substrates; Columbia Plateau south to the Great Basin and Colorado Plateau, east into Wyoming basins. Sparsely vegetated dune scrub and grassland sand sheets are not included. ....G9  
..... **M118 Intermountain Basins Cliff, Scree & Badland Sparse Vegetation**
- M3b.** Semi-desert scrub, dry grasslands, shrub steppe, and shrublands characterized by a variety of species including sparsely vegetated dune scrub and grassland sand sheets. ....M4
- M4a.** Widespread cool semi-desert macrogroup centers west of the Rockies; typically composed of *Artemisia pedatifida* (birdfoot sagebrush), *Artemisia pygmaea* (pygmy sagebrush), *Atriplex corrugata* (mat saltbush), or *Atriplex gardneri* (Gardner's saltbush) dominated dwarf-shrublands and various saltbush shrublands dominated by *Atriplex canescens* (fourwing saltbush), *Atriplex confertifolia* (shadscale saltbush), *Atriplex cuneata* (valley saltbush), *Atriplex lentiformis* (big saltbush), *Atriplex obovata* (mound saltbush), *Atriplex polycarpa* (cattle saltbush), and *Atriplex spinifera* (spinescale saltbush). Shrubs dominate either singly or mixed; substrates are typically saline, alkaline, fine-textured soils developed from shale or alluvium. ....G10  
..... **M093 Great Basin Saltbush Scrub**
- M4b.** Semi-desert scrub, dry grasslands, shrub steppe, and shrublands characterized by a variety of species including sparsely vegetated dune scrub and grassland sand sheets. If present, species of *Atriplex* (Saltbush), *Artemisia pedatifida* (birdfoot sagebrush) or *Artemisia pygmaea* (pygmy sagebrush) have low cover. ....M5
- M5a.** Shrub steppe, shrublands, and dwarf-shrublands characterized by a variety of woody *Artemisia* (sagebrush) species, such as *Artemisia arbuscula* (little sagebrush), *Artemisia bigelovii* (Bigelow



sage), *Artemisia cana* (silver sagebrush), *Artemisia frigida* (prairie sagewort), *Artemisia nova* (black sagebrush), *Artemisia papposa* (Owyhee sage), *Artemisia rigida* (scabland sagebrush), *Artemisia tridentata* (big sagebrush), *Artemisia tripartita* (threetip sagebrush). Other shrubs include *Chamaebatiaria millefolium* (fernbush), *Eriogonum* (buckwheat) dwarf-shrub species, *Purshia tridentata* (antelope bitterbrush), *Salvia dorrii* (purple sage), or *Symphoricarpos* (snow berry) species. ....M6

**M5b.** Diverse macrogroup of the semi-arid interior western U.S. Includes open shrublands, dwarf-shrublands, shrub herbaceous, or grasslands. Characteristic species include shrubs *Chrysothamnus viscidiflorus* (yellow rabbitbrush), *Coleogyne ramosissima* (blackbrush), *Ephedra* (joint-fir) spp., *Ericameria nauseosa* (rubber rabbitbrush), *Gutierrezia sarothrae* (broom snakeweed), *Krascheninnikovia lanata* (winterfat), and dry grasses such as *Achnatherum hymenoides* (Indian ricegrass), *Achnatherum lettermanii* (Letterman's needlegrass), *Aristida purpurea* (purple threeawn), *Bouteloua gracilis* (blue grama), *Hesperostipa comata* (needle-and-thread), *Leymus salinus ssp. salinus* (saline wildrye), *Muhlenbergia pungens* (sandhill muhly), *Pleuraphis jamesii* (James' galleta), *Poa fendleriana* (muttongrass), *Poa secunda* (Sandberg bluegrass), *Pseudoroegneria spicata* (bluebunch wheatgrass), *Sporobolus cryptandrus* (sand dropseed), and *Sporobolus airoides* (alkali sacaton). Mid-elevation sites in eastern and central Mojave Desert, Great Basin, Colorado Plateau, Columbia Plateau; lower elevation sites in the central Rocky Mountains east across Wyoming Basins into the western Great Plains.....G11  
..... **M171 Great Basin-Intermountain Dry Shrubland & Grassland**

**M6a.** Shrubland macrogroup of the big sagebrush shrubland and shrub-steppe that is common throughout much of the interior western U.S.; dominated by *Artemisia tridentata* (big sagebrush), *Purshia tridentata* (antelope bitterbrush), and several local dominants such as *Artemisia cana* (silver sagebrush) and *Artemisia tripartita ssp. tripartita* (threetip sagebrush).....G15  
..... **M169 Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland**

**M6b.** A macrogroup of the interior western U.S. characterized by short sagebrush taxa that form an open to moderately dense dwarf-shrub layer on shallow, rocky, calcareous or alkaline soils. Dominated by one of several diagnostic *Artemisia* (sagebrush) taxa depending on location and habitat including *Artemisia arbuscula* (little sagebrush), *Artemisia bigelovii* (Bigelow sage), *Artemisia frigida* (prairie sagewort), *Artemisia nova* (black sagebrush), *Artemisia papposa* (Owyhee sage), *Artemisia rigida* (scabland sagebrush), or *Artemisia tripartita ssp. rupicola* (Wyoming threetip sagebrush). ....G17  
..... **M170 Great Basin-Intermountain Dwarf Sagebrush Steppe & Shrubland**

**M499 Western North American Cool Semi-Desert Ruderal Scrub & Grassland**

**G7a.** Ruderal shrubland and grassland group includes vegetation strongly dominated by invasive, exotic species. Also includes shrubland and shrub-steppe with mostly native shrubs but where a significant herbaceous layer (>10% cover) is strongly dominated by non-native species (usually >90% relative cover non-native).....A18  
..... **G600 Great Basin-Intermountain Ruderal Dry Shrubland & Grassland**

**G7b.** Vegetation is not as above. There is only one group in this macrogroup.

**M095 Great Basin-Intermountain Xeric-Riparian Scrub**

**G8a.** Sparsely to densely vegetated shrublands that occur along dry watercourses that experience periodic flash flooding. ....A23  
..... **G559 Great Basin-Intermountain Shrub & Herb Wash-Arroyo**

**G8b.** Vegetation is not as above. There is only one group in this macrogroup.

**M118 Intermountain Basins Cliff, Scree & Badland Sparse Vegetation**

**G9a.** This group consists of barren and sparsely vegetated cliffs, scree slopes, badlands and other similar harsh habitats from low to high elevations, with a wide variety of trees or shrubs. ....A24  
..... **G570 Intermountain Basins Cliff, Scree & Badland Sparse Vegetation**

**G9b.** Vegetation is not as above. There is only one group in this macrogroup.

**M093 Great Basin Saltbush Scrub**

**G10a.** This dwarf-shrub scrub group occurs on gentle slopes and rolling plains in the Colorado Plateau and Uinta Basin on Mancos shale and arid, windswept basins and plains across parts of Wyoming and Montana. Characterized by an open canopy of dwarf-shrubs composed of *Artemisia pedatifida* (birdfoot sagebrush), *Atriplex corrugata* (mat saltbush), or *Atriplex gardneri* (Gardner's saltbush) sometimes with *Artemisia longifolia* (longleaf wormwood), *Artemisia*

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

*pygmaea* (pygmy sagebrush), or *Picrothamnus desertorum* (bud sagebrush) dominant or codominant. ....A27

.....G301 Intermountain Dwarf Saltbush - Sagebrush Scrub

**G10b.** Widespread semi-arid scrub group of basins, plains, alluvial flats and slopes in the intermountain western U.S. and western Great Plains; characterized by a variable shrub layer dominated or codominated by *Atriplex canescens* (fourwing saltbush), *Atriplex confertifolia* (shadscale saltbush), *Atriplex cuneata* (valley saltbush), *Atriplex hymenelytra* (desertholly), *Atriplex obovata* (mound saltbush), *Atriplex polycarpa* (cattle saltbush), *Grayia spinosa* (spiny hopsage), and/or *Picrothamnus desertorum* (bud sagebrush) often with other shrubs present to codominant. ....A30

.....G300 Intermountain Shadscale - Saltbush Scrub

#### M171 Great Basin-Intermountain Dry Shrubland & Grassland

**G11a.** This shrubby and herbaceous group occurs on sandy sites in the intermountain western U.S. and is characterized by a sparse to open layer of shrubs *Ericameria nauseosa* (rubber rabbitbrush), *Eriogonum leptocladon* (sand buckwheat), or *Tetradymia tetrameres* (fourpart horsebrush) and herbaceous species *Achnatherum hymenoides* (Indian ricegrass), *Leymus flavescens* (yellow wildrye), *Psoraleidum lanceolatum* (lemon scurfpea), and *Redfieldia flexuosa* (blowout grass), which may dominate solely or in a combination on active and stable dunes and sandsheets. ....A34

..... G775 Intermountain Sparsely Vegetated Dune Scrub & Grassland

**G11b.** Vegetation is not as above. Site is not characterized by dunes or sand sheets although substrates may be composed of sandy soils.....G12

**G12a.** This widespread semi-arid to arid grassland group occurs throughout the intermountain western U.S. and composed of dominant drought-resistant perennial bunchgrasses such as *Achnatherum* (needlegrass) spp., *Bouteloua gracilis* (blue grama), *Hesperostipa comata* (needle-and-thread), *Pleuraphis jamesii* (James' galleta), *Poa cusickii* (Cusick's bluegrass), *Poa secunda* (Sandberg bluegrass), and *Pseudoroegneria spicata* (bluebunch wheatgrass) often with scattered shrubs, especially *Artemisia tridentata* (big sagebrush), *Atriplex* (saltbush) spp., *Coleogyne ramosissima* (blackbrush), *Ephedra* (joint-fir) spp., *Gutierrezia sarothrae* (broom snakeweed), and *Krascheninnikovia lanata* (winterfat). ....A35

..... G311 Intermountain Semi-Desert Grassland

**G12b.** Semi-arid scrub or shrubland stands characterized by desert scrub, short trees, shrub, dwarf-shrubs, or stem succulents. ....G13

**G13a.** Stands dominated by *Artemisia filifolia* (sand sagebrush), *Coleogyne ramosissima* (blackbrush), *Ephedra cutleri* (Cutler's joint-fir), *Ephedra torreyana* (Torrey's joint-fir), *Ephedra viridis* (mormon-tea), *Ericameria cooperi* (Cooper's goldenbush), *Eriogonum fasciculatum* (Eastern Mojave buckwheat), *Eriogonum corymbosum* (crispleaf buckwheat), *Grayia spinosa* (spiny hopsage), *Lycium andersonii* (water jacket), *Menodora spinescens* (spiny menodora), *Nolina* (beargrass) spp., *Opuntia acanthocarpa* (buckhorn cholla), *Poliomintha incana* (frosted mint), *Purshia glandulosa* (desert bitterbrush), *Purshia stansburiana* (Stansbury cliffrose), *Quercus havardii* var. *tuckeri* (Havard oak), *Salazaria mexicana* (Mexican bladdersage), *Thamnosma montana* (turpentinebroom), r *Vancleavea stylosa* (pillar false gumweed). *Yucca brevifolia* (Joshua tree), or *Yucca schidigera* (Mojave yucca).....G14

**G13b.** This widespread, open to moderately dense dwarf-shrubland, shrubland and shrub-steppe group occurs throughout the semi-arid western U.S. and is characterized by *Chamaebatiaria millefolium* (desert sweet), *Chrysothamnus albidus* (whiteflower rabbitbrush), *Chrysothamnus viscidiflorus* (yellow rabbitbrush), *Ericameria nauseosa* (rubber rabbitbrush), *Ephedra viridis* (mormon-tea), *Ephedra torreyana* (Torrey's joint-fir), *Glossopetalon spinescens* (spiny greasebush), *Gutierrezia sarothrae* (broom snakeweed), *Gutierrezia microcephala* (threadleaf snakeweed), *Ericameria nana* (dwarf goldenbush), *Ericameria parryi* (Parry's rabbitbrush), *Ericameria teretifolia* (green rabbitbrush), *Krascheninnikovia lanata* (winterfat), *Mahonia fremontii* (Fremont's mahonia), *Opuntia polyacantha* (plains pricklypear), and *Tetradymia canescens* (spineless horsebrush) with or without an herbaceous layer. ....A41

..... G310 Intermountain Semi-Desert Steppe & Shrubland

**G14a.** This group represents the extensive desert scrub in the transition zone above *Larrea tridentata* - *Ambrosia dumosa* desert scrub and below the lower montane woodlands (700-1800 m elevation) that occurs in the Mojave Desert and transition zone into the southern Great Basin. Stands are dominated by *Coleogyne ramosissima* (blackbrush), *Ericameria cooperi* (Cooper's goldenbush), *Eriogonum fasciculatum* (Eastern Mojave buckwheat), *Ephedra* (joint-fir) spp.,

*Eriogonum corymbosum* (crispleaf buckwheat), *Grayia spinosa* (spiny hopsage), *Lycium andersonii* (water jacket), *Menodora spinescens* (spiny menodora), *Nolina* (beargrass) spp., *Opuntia acanthocarpa* (buckhorn cholla), *Purshia glandulosa* (desert bitterbrush), *Purshia stansburiana* (Stansbury cliffrose), *Salazaria mexicana* (Mexican bladdersage), *Thamnosma montana* (turpentinebroom), *Yucca brevifolia* (Joshua tree), or *Yucca schidigera* (Mojave yucca).

.....**G296 Mojave Mid-Elevation Mixed Desert Scrub\***

**G14b.** This typically open shrubland group occurs in the Colorado Plateau on sandy substrates and is dominated by *Artemisia filifolia* (sand sagebrush), *Coleogyne ramosissima* (blackbrush), *Ephedra cutleri* (Cutler's joint-fir), *Ephedra torreyana* (Torrey's joint-fir), *Ephedra viridis* (mormon-tea), *Poliomintha incana* (frosted mint), *Quercus havardii* var. *tuckeri* (Havard oak), or *Vanceleva stylosa* (pillar false gumweed). ..... **G312 Colorado Plateau Blackbrush - Mormon-tea Shrubland\***

#### **M169 Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland**

**G15a.** This sagebrush shrubland and shrub-steppe group is found at montane and subalpine elevations across the western U.S. and is composed primarily of *Artemisia tridentata* ssp. *vaseyana* (mountain big sagebrush), *Artemisia cana* ssp. *bolanderi* (silver sagebrush), *Artemisia cana* ssp. *viscidula* (silver sagebrush), and related taxa such as *Artemisia tridentata* ssp. *spiciformis* (big sagebrush) and *Artemisia rothrockii* (timberline sagebrush) with *Symphoricarpos* (snowberry) spp. often codominant and there is usually an abundant perennial herbaceous layer (over 25% cover). ..... **A49**

..... **G304 Intermountain Mountain Big Sagebrush Steppe & Shrubland**

**G15b.** Vegetation dominated not dominated by *Artemisia tridentata* ssp. *vaseyana* (mountain big sagebrush), *Artemisia cana* ssp. *bolanderi* (silver sagebrush), *Artemisia cana* ssp. *viscidula* (silver sagebrush), and *Artemisia tridentata* ssp. *spiciformis* (spiked big sagebrush) and *Artemisia rothrockii* (timberline sagebrush) are typically absent. .... **G16**

**G16a.** This widely distributed, matrix-forming shrubland group is concentrated in the drier, more southerly portions of the interior western U.S., but extends into xeric portions of the Columbia Plateau, Rocky Mountains, across Wyoming into the northwestern Great Plains. Vegetation is typically dominated by *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush) and *Artemisia tridentata* ssp. *tridentata* (basin big sagebrush), sometimes codominated by xeric shrubs such as *Atriplex* (saltbush) spp., with a typically sparse to open herbaceous layer dominated by dry-site graminoids. .... **A52**

..... **G303 Intermountain Dry Tall Sagebrush Steppe & Shrubland**

**G16b.** This matrix-forming sagebrush steppe and shrubland group occurs throughout the interior western U.S., across Wyoming into the northwestern Great Plains and is characterized by an open to sparse shrub layer of *Artemisia tridentata* (big sagebrush) (ssp. *tridentata*, ssp. *xericensis*) or *Artemisia tripartita* ssp. *tripartita* (threetip sagebrush) with an often dense herbaceous layer dominated by perennial bunchgrasses such as *Achnatherum occidentale* (western needlegrass), *Festuca campestris* (rough fescue), *Festuca idahoensis* (Idaho fescue), *Leymus cinereus* (basin wildrye), *Poa secunda* (Sandberg bluegrass), and *Pseudoroegneria spicata* (bluebunch wheatgrass). .... **A54**

..... **G302 Intermountain Mesic Tall Sagebrush Steppe & Shrubland**

#### **M170 Great Basin-Intermountain Dwarf Sagebrush Steppe & Shrubland**

**G17a.** This open to moderately dense, semi-arid dwarf-shrubland and steppe occurs throughout the intermountain western U.S. and is dominated by one of the following: *Artemisia arbuscula* ssp. *arbuscula* (little sagebrush), *Artemisia arbuscula* ssp. *longicaulis* (little sagebrush), *Artemisia arbuscula* ssp. *longiloba* (little sagebrush), *Artemisia arbuscula* ssp. *thermopola* (little sagebrush), *Artemisia bigelovii* (Bigelow sage), *Artemisia frigida* (prairie sagewort), *Artemisia nova* (black sagebrush), or *Artemisia tripartita* ssp. *rupicola* (Wyoming threetip sagebrush) depending on environment and species distribution. .... **A57**

..... **G308 Intermountain Low & Black Sagebrush Steppe & Shrubland**

**G17b.** This Columbia Plateau group forms extensive low shrublands dominated by diagnostic dwarf-shrubs, *Artemisia rigida* (scabland sagebrush), *Salvia dorrii* (purple sage), and/or diagnostic species of *Eriogonum* (buckwheat) such as *Eriogonum compositum* (arrowleaf buckwheat), *Eriogonum douglasii* (Douglas' buckwheat), *Eriogonum microthecum* (slender buckwheat), *Eriogonum niveum* (snow buckwheat), *Eriogonum sphaerocephalum* (rock buckwheat), *Eriogonum strictum* (Blue Mountain buckwheat), and *Eriogonum thymoides* (thymeleaf buckwheat). .... **A63**

..... **G307 Columbia Plateau Scabland Dwarf-shrubland**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

**G600 Great Basin-Intermountain Ruderal Dry Shrubland & Grassland**

- A18a.** Vegetation is dominated by woody vegetation .....**A19**  
**A18b.** Vegetation is dominated by herbaceous vegetation.....**A20**

**A19a.** This cool, semi-arid interior western U.S. ruderal shrubland alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic shrub species such as *Alhagi maurorum* (camelthorn), *Cytisus striatus* (striated broom), or *Zygophyllum fabago* (Syrian beancaper) and occurs in disturbed dry to mesic basins, alluvial fans, and foothills at elevations up to 2200 m. ....**A3253 Alhagi maurorum - Zygophyllum fabago Ruderal Shrubland Alliance**

**A19b.** This cool, semi-arid interior western U.S. ruderal shrubland alliance is dominated by species of *Artemisia* (sagebrush) often with other native shrubs present to codominant. The open to moderate herbaceous understory (generally > 10% cover) strongly dominated (>90% relative cover) by non-native herbaceous species; a widespread example is *Artemisia tridentata* (big sagebrush) / *Bromus tectorum* (cheatgrass) shrubland. ....  
.....**A4213 Artemisia spp. - Mixed Shrub Ruderal Understory Shrubland Alliance**

**A20a.** Vegetation is dominated by herbaceous annual species. ....**A21**

**A20b.** Vegetation is dominated by herbaceous perennial species. ....**A22**

**A21a.** This ruderal annual grassland alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic annual grass species such as *Bromus tectorum* (cheatgrass), and less commonly *Bromus arvensis* (field brome), *Bromus hordeaceus* (soft brome), *Bromus madritensis* (compact brome), or *Taeniatherum caput-medusae* (medusahead). It occurs in disturbed dry to mesic basins, alluvial fans, and foothills at elevations up to 2200 m. ....  
..... **A1814 Bromus tectorum - Taeniatherum caput-medusae Ruderal Annual Grassland Alliance**

**A21b.** This ruderal annual herbaceous alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic annual forb species such as *Brassica nigra* (black mustard), *Centaurea melitensis* (Maltese star-thistle), *Centaurea solstitialis* (yellow star-thistle), *Crupina vulgaris* (common crupina), *Cynoglossum officinale* (gypsyflower), *Hyoscyamus niger* (black henbane), *Isatis tinctoria* (Dyer's woad), or *Salsola tragus* (prickly Russian thistle) and occurs in disturbed dry to mesic basins, alluvial fans, and foothills at elevations up to 2200 m. ....  
.. **A3257 Centaurea solstitialis - Isatis tinctoria - Salsola tragus Ruderal Annual Forb Alliance**

**A22a.** This ruderal perennial grassland alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic perennial grasses, especially *Agropyron cristatum* (crested wheatgrass), which can occur as a near-monoculture or mixed grassland with other exotic perennial grasses such as *Poa pratensis* (Kentucky bluegrass) and exotic perennial forbs and annuals. ....**A4148 Agropyron cristatum Western Ruderal Perennial Grassland Alliance**

**A22b.** This ruderal herbaceous alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic perennial forbs such as *Acroptilon repens* (hardheads), *Cardaria draba* (whitetop), *Centaurea calcitrapa* (red star-thistle), *Centaurea diffusa* (diffuse knapweed), *Centaurea iberica* (Iberian knapweed), *Centaurea biebersteinii* (spotted knapweed), *Centaurea triumfettii* (squarrose knapweed), *Euphorbia esula* (leafy spurge), *Hypericum perforatum* (common St. Johnswort), *Lepidium latifolium* (broadleaved pepperweed), *Linaria dalmatica* (Dalmatian toadflax), *Linaria vulgaris* (butter and eggs), or *Peganum harmala* (harmal peganum) and occurs in disturbed dry to mesic basins, alluvial fans, and foothills at elevations up to 2200 m. ....  
.....**A3255 Cardaria draba - Centaurea spp. - Lepidium latifolium Ruderal Perennial Forb Alliance**

**G559 Great Basin-Intermountain Shrub & Herb Wash-Arroyo**

**A23a.** This alliance is characterized by low cover of mixed shrubs and is generally dominated by *Atriplex canescens* (fourwing saltbush) and/or *Ericameria nauseosa* (rubber rabbitbrush) with several other shrubs. Stands occurs in cold desert washes of Arizona, Colorado, Nevada and Utah. .... **A3266 Atriplex canescens - Ericameria nauseosa Desert Wash Alliance**

**A23b.** Currently there is only a single alliance in this Group. ....

**G570 Intermountain Basins Cliff, Scree & Badland Sparse Vegetation**

**A24a.** This alliance consists of widely scattered trees and shrubs (with <10% vascular plant cover), including *Atriplex* (saltbush) spp., *Cercocarpus intricatus* (littleleaf mountain mahogany), *Cercocarpus montanus* (alderleaf mountain-mahogany), *Coleogyne ramosissima* (blackbrush), *Juniperus* (juniper) spp., and *Pinus ponderosa* (ponderosa pine). It ranges from



Wyoming and Utah west across the intermountain western U.S., is found from foothill to lower montane elevations and includes steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types.....

..... **A4051 Pinus ponderosa - Cercocarpus intricatus Bedrock Cliff & Canyon Wooded Scrub Alliance**

**A24b.** Vegetation consists of various shrubs. .... **A25**

**A25a.** This sparsely vegetated alliance (<10% vascular cover) has varied characteristic species such as *Enceliopsis nudicaulis* (nakedstem sunray), *Eriogonum brevicaulis* (shortstem buckwheat), *Leymus salinus ssp. salinus* (saline wildrye), *Leymus salinus ssp. salmonis* (Salmon wildrye), *Lupinus argenteus* (silvery lupine), *Pseudoroegneria spicata* (bluebunch wheatgrass), and/or *Zuckia brandegeei* (siltbush). It occurs throughout the Intermountain West on badlands of shales, siltstones or mudstones on typically rounded hills and plains that form a rolling topography that can be steep and highly eroded.....

..... **A4052 Ephedra spp. - Leymus salinus - Eriogonum corymbosum Badlands Cold Desert Sparse Vegetation Alliance**

**A25b.** Site is not badlands of shales, siltstones or mudstones on typically rounded hills and plains..... **A26**

**A26a.** This sparsely vegetated (<10% vascular plant cover) scrub alliance is composed of *Artemisia bigelovii* (Bigelow sage), *Atriplex canescens* (fourwing saltbush), *Brickellia* (brickellbush) spp., *Chrysothamnus viscidiflorus* (yellow rabbitbrush), *Ephedra viridis* (mormon-tea), *Ericameria nauseosa* (rubber rabbitbrush), *Fallugia paradoxa* (Apache plume), and/or *Rhus trilobata* (skunkbush sumac). It occurs on talus and colluvial slopes in the intermountain western U.S. ....

..... **A4050 Ephedra viridis - Chrysothamnus viscidiflorus - Rhus trilobata Talus Sparse Scrub Alliance**

**A26b.** This sparsely vegetated (<10% vascular plant cover) scrub and subshrub-dominated is composed of *Artemisia filifolia* (sand sagebrush), *Atriplex canescens* (fourwing saltbush), *Ephedra* (joint-fir) spp., *Eriogonum corymbosum* (crispleaf buckwheat), *Eriogonum ovalifolium* (cushion buckwheat), and/or *Fallugia paradoxa* (Apache plume). It occurs on lava flows, cinder fields, and sand dunes in the intermountain western U.S.....

**A4053 Eriogonum ovalifolium - Fallugia paradoxa - Andropogon hallii Lava & Cinder Sparse Vegetation Alliance**

### **G301 Intermountain Dwarf Saltbush - Sagebrush Scrub**

**A27a.** This low scrub alliance is characterized by a sparse dwarf-shrub layer of *Artemisia pygmaea* (pygmy sagebrush) and occurs in relatively dry areas of the sagebrush desert of Nevada and Utah, from 1200-1800 m in elevation. ....

..... **A1106 Artemisia pygmaea Low Scrub Alliance**

**A27b.** Vegetation is not characterized *Artemisia pygmaea* (pygmy sagebrush). .... **A28**

**A28a.** This low scrub alliance are dominated by the halophytic, evergreen dwarf-shrub *Atriplex corrugata* (mat saltbush) and found on lower hillslopes and alkaline flats on the Colorado Plateau portions of northwestern New Mexico, western Colorado and Utah.....

..... **A1109 Atriplex corrugata Low Scrub Alliance\***

**A28b.** Vegetation is not characterized *Atriplex corrugata* (mat saltbush). .... **A29**

**A29a.** This low scrub alliance has a very sparse to moderately dense cover of dwarf-shrubs that is dominated by *Atriplex gardneri* (Gardner's saltbush). *Artemisia pedatifida* (birdfoot sagebrush) is absent. Stands occur on mesas, plains, low hills and eroded "badlands" in Colorado Plateau extending into Wyoming and Montana.....

..... **A1110 Atriplex gardneri Low Scrub Alliance**

**A29b.** This low scrub alliance is dominated or codominated by *Artemisia pedatifida* (birdfoot sagebrush). *Atriplex gardneri* (Gardner's saltbush) may be present to codominant. Stands are reported from the Pryor Mountains in the northern portion of the Bighorn Basin of south-central Montana. ....

..... **A1127 Artemisia pedatifida Low Scrub Alliance\***

### **G300 Intermountain Shadscale - Saltbush Scrub**

**A30a.** This scrub alliance is characterized by a sparse to moderately dense shrub layer of *Grayia spinosa* (spiny hopsage). Associates with Mojavean or Great Basin affinities may be present to codominant, however species of *Atriplex* (saltbush) are typically absent or have very low cover. It occurs in the Great Basin and the eastern Mojave Desert.....



- .....**A3171 Grayia spinosa Scrub Alliance**
- A30b.** Vegetation is characterized by species of *Atriplex* (saltbush). *Grayia spinosa* (spiny hopsage) may be present to codominant. ....**A31**
- A31a.** This scrub alliance is characterized by a sparse to moderately dense shrub layer dominated or codominated by *Atriplex polycarpa* (cattle saltbush). Stands occur in desert valleys, basins, playas, bajadas, foothills and plains. .... **A3174 Atriplex polycarpa Scrub Alliance**
- A31b.** Vegetation is characterized by other species of *Atriplex* (saltbush). *Grayia spinosa* (spiny hopsage) may be present to codominant. ....**A33**
- A32a.** This scrub alliance is dominated or codominated by *Atriplex obovata* (mound saltbush) or *Atriplex cuneata* (valley saltbush) that occurs in the northern Chihuahuan Desert and Colorado Plateau from western Texas, south-central and northwestern New Mexico, and northeastern Arizona.....**A3180 Atriplex obovata - Atriplex cuneata Scrub Alliance\***
- A32b.** Vegetation is characterized by *Atriplex canescens* (fourwing saltbush), *Atriplex confertifolia* (shadscale saltbush) and/or *Picrothamnus desertorum* (bud sagebrush). *Grayia spinosa* (spiny hopsage) may be present to codominant. ....**A33**
- A33a.** This widespread scrub alliance has a sparse to moderately dense (10-60% cover) short-shrub canopy (approximately 1.5 m tall) that is dominated by the facultative deciduous, xeromorphic shrub *Atriplex canescens* (fourwing saltbush). Other shrubs such as *Artemisia tridentata* (big sagebrush), *Ephedra viridis* (mormon-tea), or *Krascheninnikovia lanata* (winterfat) may codominate..... **A0869 Atriplex canescens Scrub Alliance**
- A33b.** This widespread scrub alliance is characterized by a sparse to moderately dense shrub layer dominated or codominated by *Atriplex confertifolia* (shadscale saltbush) and/or *Picrothamnus desertorum* (bud sagebrush). Several other semi-desert shrubs may be present to codominant. .... **A0870 Atriplex confertifolia Scrub Alliance**

**G775 Intermountain Sparsely Vegetated Dune Scrub & Grassland**

- A34a.** This herbaceous alliance occurs on sandy sites in the intermountain western U.S. and is characterized by a sparse to an open herbaceous layer composed of *Redfieldia flexuosa* (blowout grass), *Leymus flavescens* (yellow wildrye), *Achnatherum hymenoides* (Indian ricegrass), and *Psoralidium lanceolatum* (lemon scurfpea), which may dominate solely or in combination on active and stable dunes and sandsheets.....  
..... **A4011 Redfieldia flexuosa - Leymus flavescens - Achnatherum hymenoides Grassland Alliance**
- A34b.** This scrub alliance includes sparsely vegetated scrub of sand dunes, sandsheets and sand blowouts of the western U.S. dominated by *Ericameria nauseosa* (rubber rabbitbrush), *Eriogonum leptocladon* (sand buckwheat), and/or *Tetradymia tetrameres* (fourpart horsebrush), with herbaceous understory of sand indicator species such as *Achnatherum hymenoides* (Indian ricegrass), *Leymus flavescens* (yellow wildrye), *Muhlenbergia pungens* (sandhill muhly), and/or *Psoralidium lanceolatum* (lemon scurfpea).....  
..... **A4149 Ericameria nauseosa - Eriogonum leptocladon - Tetradymia tetrameres Sparse Scrub Alliance**

**G311 Intermountain Semi-Desert Grassland**

- A35a.** This herbaceous alliance is dominated by perennial forbs such as *Sphaeralcea ambigua* (desert globemallow), often codominant with *Sphaeralcea coccinea* (scarlet globemallow) and/or *Sphaeralcea parvifolia* (small-leaf globemallow). Stands occur across the western US.  
.. **A4216 Sphaeralcea ambigua - Sphaeralcea coccinea - Sphaeralcea parvifolia Dry Meadow Alliance**
- A35b.** Vegetation is dominated by an herbaceous layer largely composed of perennial grasses. ....**A36**
- A36a.** This grassland alliance is dominated by *Achnatherum speciosum* (desert needlegrass), which is the sole dominant or important plant in the herbaceous layer. Stands occur in the Mojave Desert. .... **A1290 Achnatherum speciosum Grassland Alliance**
- A36b.** Vegetation is not dominated or codominated by *Achnatherum speciosum* (desert needlegrass). If present, this grass has very low cover. ....**A37**
- A37a.** This grassland alliance is dominated by *Sporobolus cryptandrus* (sand dropseed), often codominant with *Aristida purpurea var. longiseta* (Fendler's threewawn) or *Poa secunda* (Sandberg bluegrass). Stands occur on gentle lower slopes, river terraces and alluvial bars on

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

hot, dry sites in the Columbia Basin and lower Snake and Clearwater rivers in Oregon and Washington and in the lowest elevations of Hells Canyon within the Blue Mountains in Idaho, and in the Bighorn Basin in Montana. ....

..... **A3977 Sporobolus cryptandrus - Aristida purpurea var. longiseta - Poa secunda Sandy Stream Terrace Grassland Alliance**

**A37b.** Vegetation is not dominated or codominated by *Sporobolus cryptandrus* (sand dropseed) and/or *Aristida purpurea var. longiseta* (Fendler's threeawn), or if present then stand does not occur on river terraces and alluvial bars the Columbia Basin and lower Snake and Clearwater rivers in Idaho, Oregon and Washington, or along the Bighorn River in the Bighorn Basin in Montana. .... **A38**

**A38a.** Grasslands characterized by a sparse to moderately dense graminoid layer dominated or codominated by *Achnatherum hymenoides* (Indian ricegrass), *Aristida purpurea var. longiseta* (Fendler's threeawn), *Muhlenbergia pungens* (sandhill muhly), and/or *Pseudoroegneria spicata* (bluebunch wheatgrass) often with *Poa secunda* (Sandberg bluegrass) present to codominate. Stands occur in the canyons and valleys of the northern Great Basin and in the Columbia Basin, southern and middle Rocky Mountains, Colorado Plateau, and adjacent ecoregions. .... **A39**

**A38b.** Grasslands dominated or codominated by *Aristida purpurea* (purple threeawn), *Bouteloua eriopoda* (black grama), *Bouteloua gracilis* (blue grama), *Hesperostipa comata* (needle-and-thread), *Pleuraphis jamesii* (James' galleta), or *Sporobolus airoides* (alkali sacaton) and/or *Sporobolus cryptandrus* (sand dropseed). .... **A40**

**A39a.** This grassland alliance is characterized by a sparse to moderately dense graminoid layer dominated or codominated by *Pseudoroegneria spicata* (bluebunch wheatgrass) and/or *Aristida purpurea var. longiseta* (Fendler's threeawn) often with *Poa secunda* (Sandberg bluegrass) present to codominate. *Pseudoroegneria spicata* (bluebunch wheatgrass) is sometimes absent or has low cover, and *Sporobolus cryptandrus* (sand dropseed) and *Opuntia polyacantha* (plains pricklypear) may be especially abundant on disturbed or harsh windswept sites. Stands occur in the canyons and valleys of the northern Great Basin and in the Columbia Basin. ....

..... **A3976 Pseudoroegneria spicata - Opuntia polyacantha Dry Canyon Slope Grassland Alliance**

**A39b.** This grassland alliance is dominated by a variety of grasses, the most frequently occurring being *Achnatherum hymenoides* (Indian ricegrass), *Muhlenbergia pungens* (sandhill muhly), and *Pseudoroegneria spicata* (bluebunch wheatgrass), and occurs in the southern and middle Rocky Mountains and Colorado Plateau, into adjacent ecoregions. ....

..... **A1262 Achnatherum hymenoides - Pseudoroegneria spicata - Muhlenbergia pungens Grassland Alliance**

**A40a.** This grassland alliance is dominated or codominated by *Bouteloua eriopoda* (black grama), *Bouteloua gracilis* (blue grama), *Pleuraphis jamesii* (James' galleta), or *Sporobolus airoides* (alkali sacaton). It occurs in arid and semi-arid regions in the southwestern Great Plains, Colorado Plateau, southern Rocky Mountains, Great Basin, and northern Chihuahuan Desert. ....

..... **A1287 Pleuraphis jamesii Grassland Alliance**

**A40b.** This grassland alliance is dominated or codominated by *Aristida purpurea* (purple threeawn), *Hesperostipa comata* (needle-and-thread), and/or *Sporobolus cryptandrus* (sand dropseed) often with *Bouteloua gracilis* (blue grama) present to codominant. Stands are found primarily from Wyoming Basins, Colorado Plateau and Great Basin ecoregions. ....

..... **A1270 Hesperostipa comata Grassland Alliance**

**G310 Intermountain Semi-Desert Steppe & Shrubland**

**A41a.** Vegetation is a shrubland and shrub steppe dominated by species of *Chrysothamnus* (rabbitbrush) or *Ericameria* (goldenbush). .... **A42**

**A41b.** Vegetation is a dwarf-shrubland, shrubland or shrub steppe dominated by other shrubs and dwarf-shrubs such as *Glossopetalon spinescens* (spiny greasebush), *Gutierrezia microcephala* threadleaf snakeweed), *Gutierrezia sarothrae* (broom snakeweed), *Krascheninnikovia lanata* (winterfat), and/or species of *Opuntia* (pricklypear) cacti. .... **A46**

**A42a.** Vegetation is dominated by *Chrysothamnus albidus* (whiteflower rabbitbrush) or *Chrysothamnus viscidiflorus* (yellow rabbitbrush) shrubs. .... **A43**

**A42b.** Vegetation is dominated by *Ericameria nauseosa* (rubber rabbitbrush), *Ericameria parryi* (Parry's rabbitbrush) or *Ericameria teretifolia* (green rabbitbrush) shrubs. .... **A44**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- A43a.** This shrubland alliance has a sparse woody layer dominated by the microphyllous evergreen shrub *Chrysothamnus albidus* (whiteflower rabbitbrush) and occurs around seeps, saline meadows and flats, and around pluvial lakes in the Great Basin. .... **A0834 Chrysothamnus albidus Shrubland Alliance**
- A43b.** This shrub steppe and shrubland alliance is characterized by a sparse to dense layer of *Chrysothamnus viscidiflorus* (yellow rabbitbrush) and sparse to dense layer of graminoids and is known from in the southern San Luis Valley of Colorado, the lower slopes of mountains in western Wyoming and northern Utah, and on mesas and high plateaus of the Colorado Plateau. .... **A3195 Chrysothamnus viscidiflorus Steppe & Shrubland Alliance**
- A44a.** This xeromorphic shrubland alliance is dominated by *Ericameria teretifolia* (green rabbitbrush) and occurs from southern California mountains and valleys to the Mojave Desert, north into the southeastern Great Basin. .... **A2540 Ericameria teretifolia Shrubland Alliance**
- A44b.** Vegetation not dominated by *Ericameria teretifolia* (green rabbitbrush). .... **A45**
- A45a.** This shrub steppe and shrubland alliance has an open to closed shrub layer dominated by *Ericameria nauseosa* (rubber rabbitbrush) and includes both natural and semi-natural stands from localized areas across the northern Great Plains and throughout the western U.S. .... **A3196 Ericameria nauseosa Steppe & Shrubland Alliance**
- A45b.** This shrub steppe and shrubland alliance is characterized by having a sparse to dense shrub layer dominated by *Ericameria parryi* (Parry's rabbitbrush). It occurs in the Great Basin, Arizona-New Mexico Mountains, Colorado Plateau and in isolated locations in the northern Coast Ranges of California. .... **A3197 Ericameria parryi Shrubland Alliance**
- A46a.** This widespread alliance is characterized by a sparse to dense layer of *Krascheninnikovia lanata* (winterfat). .... **A3202 Krascheninnikovia lanata Steppe & Dwarf-shrubland Alliance**
- A46b.** Vegetation is not characterized by *Krascheninnikovia lanata* (winterfat) shrubs ..... **A47**
- A47a.** This sparse shrubland alliance is dominated by the xeromorphic shrub *Glossopetalon spinescens* (spiny greasebush) and occurs along the rims of the Snake River and Imnaha River canyons in Idaho and eastern Oregon and likely elsewhere in the intermountain western US. .... **A1032 Glossopetalon spinescens Shrubland Alliance**
- A47b.** Vegetation is not characterized by *Glossopetalon spinescens* (spiny greasebush). .... **A48**
- A48a.** This alliance is dominated by clumps of various *Opuntia* (pricklypear) cacti and occurs in disturbed or extremely xeric sites with coarse soils throughout the Colorado Plateau and adjacent ecoregions. .... **A2650 Opuntia spp. Colorado Plateau Shrubland Alliance**
- A48b.** This alliance represents shrub and shrub herbaceous vegetation dominated by *Gutierrezia sarothrae* (broom snakeweed) or less frequently *Gutierrezia microcephala* (threadleaf snakeweed) with a sparse to dense herbaceous layer composed of perennial graminoids. Stands occur of the Colorado Plateau and southern Rocky Mountains and in adjacent ecoregions. .... **A3203 Gutierrezia sarothrae - Gutierrezia microcephala Dwarf-shrubland Alliance**

**G304 Intermountain Mountain Big Sagebrush Steppe & Shrubland**

- A49a.** Vegetation is dominated or codominated by *Artemisia tridentata* (big sagebrush) ..... **A50**
- A49b.** Vegetation is dominated by other species of *Artemisia* (sagebrush) ..... **A51**
- A50a.** This steppe and shrubland alliance is characterized by a moderate to dense shrub layer dominated by *Artemisia tridentata ssp. vaseyana* (mountain big sagebrush) or *Artemisia tridentata ssp. spiciformis* (spiked big sagebrush). If other shrubs are present, they have low cover and do not codominate. Stands form large, continuous stands on mid-elevation mountain slopes and foothills, and as patches within montane or subalpine coniferous forests in mountainous areas across the western U.S. .... **A3207 Artemisia tridentata ssp. spiciformis - Artemisia tridentata ssp. vaseyana Steppe & Shrubland Alliance**
- A50b.** This steppe and shrubland alliance is characterized by a moderate to dense shrub layer in which *Artemisia tridentata ssp. vaseyana* (mountain big sagebrush) is codominant with non-sagebrush shrub species *Amelanchier utahensis* (Utah serviceberry), *Holodiscus dumosus* (rockspirea), *Purshia tridentata* (antelope bitterbrush), or *Symphoricarpos oreophilus* (mountain snowberry). Perennial graminoids typically dominate the open to moderately

dense herbaceous layer. This alliance forms large, continuous stands on mid-elevation mountain slopes and foothills, and can extend above the lower treeline patches within montane or subalpine coniferous forests across the western U.S.....  
.....**A3208 Artemisia tridentata ssp. vaseyana - Mixed Steppe & Shrubland Alliance**

**A51a.** This shrubland alliance is heavily dominated by dwarf-shrub *Artemisia rothrockii* (timberline sagebrush). The only shrubs which co-occur are *Symphoricarpos rotundifolius* (roundleaf snowberry), *Ribes montigenum* (gooseberry currant), and *Holodiscus discolor* (oceanspray). Graminoids dominate the open herbaceous layer. Stands occur on slopes and ridges in the subalpine regions of California. ....  
..... **A1098 Artemisia rothrockii Shrubland Alliance**

**A51b.** This steppe and shrubland alliance is characterized by an open to closed, medium-tall shrub canopy of *Artemisia cana ssp. viscidula* (mountain silver sagebrush) or *Artemisia cana ssp. bolanderi* (Bolander's silver sagebrush) with dry graminoids in the understory. Stands occur throughout the northern half of the Intermountain West in relatively moist environments, including mesic alkaline or saline basins, but not wetland or riparian sites (see riparian and wetland Key).....  
.....**A3200 Artemisia cana ssp. bolanderi - Artemisia cana ssp. viscidula Steppe & Shrubland Alliance**

### **G303 Intermountain Dry Tall Sagebrush Steppe & Shrubland**

**A52a.** This dry steppe and shrubland alliance is dominated by *Artemisia tridentata ssp. tridentata* (basin big sagebrush) or *Artemisia tridentata ssp. xericensis* (foothill big sagebrush). Other shrubs have low cover, except species that increase with disturbance such as *Gutierrezia sarothrae* (broom snakeweed), *Chrysothamnus viscidiflorus* (yellow rabbitbrush), and *Ericameria nauseosa* (rubber rabbitbrush). The understory, if present, is characterized by dry-site grass species.....  
..... **A3194 Artemisia tridentata ssp. tridentata - Artemisia tridentata ssp. xericensis Dry Steppe & Shrubland Alliance**

**A52b.** Vegetation is not dominated by *Artemisia tridentata ssp. tridentata* (basin big sagebrush) or *Artemisia tridentata ssp. xericensis* (big sagebrush). .....**A53**

**A53a.** This dry steppe and shrubland alliance is dominated by *Artemisia tridentata ssp. wyomingensis* (Wyoming big sagebrush). Other shrubs have low cover, except species that increase with disturbance such as *Gutierrezia sarothrae* (broom snakeweed), *Chrysothamnus viscidiflorus* (yellow rabbitbrush), and *Ericameria nauseosa* (rubber rabbitbrush). This understory is a sparse to moderately dense herbaceous layer characterized by dry-site perennial graminoids such as *Achnatherum hymenoides* (Indian ricegrass), *Bouteloua gracilis* (blue grama), *Carex filifolia* (threadleaf sedge), *Distichlis spicata* (saltgrass), *Elymus elymoides* (squirreltail), *Hesperostipa comata* (needle-and-thread), *Pleuraphis jamesii* (James' galleta), and *Poa fendleriana* (muttongrass). Stands occur in the western United States on dry steppes with core distribution in the Great Basin, Colorado Plateau and Wyoming. ....  
..... **A3184 Artemisia tridentata ssp. wyomingensis Dry Steppe & Shrubland Alliance**

**A53b.** This dry steppe and shrubland alliance has a mixed shrub canopy codominated by *Artemisia tridentata* (big sagebrush) with dry-site shrub species such as *Atriplex canescens* (fourwing saltbush), *Atriplex confertifolia* (shadscale saltbush), *Ephedra fasciculata* (Arizona joint-fir), *Ephedra viridis* (mormon-tea), *Ephedra nevadensis* (Nevada joint-fir), *Grayia spinosa* (spiny hopsage), *Sarcobatus vermiculatus* (greasewood), or *Tetradymia canescens* (spineless horsebrush) present to codominant. The sparse to moderately dense herbaceous layer is dominated by dry-site perennial graminoids and diverse forbs. ....  
.....**A3198 Artemisia tridentata - Mixed Shrub Dry Steppe & Shrubland Alliance**

### **G302 Intermountain Mesic Tall Sagebrush Steppe & Shrubland**

**A54a.** This mesic steppe and shrubland alliance is characterized by an open to moderately dense short-shrub layer dominated or codominated by *Purshia tridentata* (antelope bitterbrush) with *Artemisia tridentata* (big sagebrush) and sometimes *Prunus virginiana* (chokecherry) present to codominant. The understory is sparse to dense and typically dominated by perennial bunchgrasses such as *Achnatherum hymenoides* (Indian ricegrass), *Achnatherum nelsonii* (Columbia needlegrass), *Achnatherum occidentale* (western needlegrass), *Festuca campestris* (rough fescue), *Festuca idahoensis* (Idaho fescue), *Hesperostipa comata* (needle-and-thread), *Leymus cinereus* (basin wildrye), *Poa secunda* (Sandberg bluegrass), and *Pseudoroegneria spicata* (bluebunch wheatgrass).....  
.....**A3179 Purshia tridentata - Artemisia tridentata Mesic Steppe & Shrubland Alliance**

**A54b.** Vegetation is not characterized by an open to moderately dense short-shrub layer dominated or codominated by *Purshia tridentata* (antelope bitterbrush).....**A55**



- A55a.** This mesic steppe and shrubland alliance is characterized by an open to moderately dense shrub layer dominated or codominated by *Artemisia tripartita* (threetip sagebrush) with 10-25% cover, often with herbaceous species having equal or greater coverage than shrubs. Stands are distributed from the Columbia Basin east to the northern Rocky Mountains. ....  
**..A1528 Artemisia tripartita ssp. tripartita - Artemisia tridentata Mesic Steppe & Shrubland Alliance**
- A55b.** Vegetation is not characterized by an open to moderately dense shrub layer dominated or codominated by *Artemisia tripartita* (threetip sagebrush). ..... **A56**
- A56a.** This widespread mesic steppe and shrubland alliance is characterized by an open to dense shrub layer dominated (or codominated with at least 40% relative cover (in mixed stands) by *Artemisia tridentata ssp. wyomingensis* (Wyoming big sagebrush). Common associates include *Atriplex confertifolia* (shadscale saltbush), *Artemisia frigida* (prairie sagewort), *Krascheninnikovia lanata* (winterfat), *Purshia tridentata* (antelope bitterbrush), and *Symphoricarpos longiflorus* (desert snowberry). The sparse to dense herbaceous layer dominated by dry-mesic perennial bunchgrasses, especially *Festuca idahoensis* (Idaho fescue), *Hesperostipa comata* (needle-and-thread), *Pascopyrum smithii* (western wheatgrass), and *Pseudoroegneria spicata* (bluebunch wheatgrass). .....  
**..... A3182 Artemisia tridentata ssp. wyomingensis Mesic Steppe & Shrubland Alliance**
- A56b.** This widespread mesic steppe and shrubland alliance is characterized by an open to moderately dense shrub layer of *Artemisia tridentata ssp. tridentata* (basin big sagebrush) or *Artemisia tridentata ssp. xericensis* (big sagebrush) with a sparse to dense herbaceous layer dominated by dry-mesic perennial bunchgrasses, especially *Elymus lanceolatus* (thickspike wheatgrass), *Festuca idahoensis* (Idaho fescue), *Hesperostipa comata* (needle-and-thread), *Leymus cinereus* (basin wildrye), *Pascopyrum smithii* (western wheatgrass), and *Pseudoroegneria spicata* (bluebunch wheatgrass). It occurs on sloping fans, footslopes, rolling hills, and especially deep, well-drained alluvial bottomlands with vegetation .....  
**..... A3183 Artemisia tridentata ssp. tridentata - Artemisia tridentata ssp. xericensis Mesic Steppe & Shrubland Alliance**
- G308 Intermountain Low & Black Sagebrush Steppe & Shrubland**
- A57a.** Vegetation dominated or codominated by varieties of *Artemisia arbuscula* (little sagebrush) ..... **A58**
- A57b.** Vegetation dominated by *Artemisia bigelovii* (Bigelow sage), *Artemisia nova* (black sagebrush), and/or *Artemisia frigida* (prairie sagewort). ..... **A61**
- A58a.** This steppe and shrubland alliance is dominated by *Artemisia arbuscula ssp. arbuscula* (little sagebrush) often in association with *Artemisia tridentata* (big sagebrush). This widespread alliance is known from cold, dry areas of the Intermountain West, as well as in dry alpine and subalpine habitats of the Sierra Nevada. ....  
**..... A3219 Artemisia arbuscula ssp. arbuscula Steppe & Shrubland Alliance**
- A58b.** Vegetation not dominated by *Artemisia arbuscula ssp. arbuscula* (little sagebrush). ..... **A59**
- A59a.** This shrubland alliance is dominated by a low-shrub layer of *Artemisia arbuscula ssp. longicaulis* (Lahontan sagebrush) and is known from cold, dry areas of the Intermountain West, in and around the Lahontan Basin of northwestern Nevada, southeastern Oregon, and northeastern California. .... **A2548 Artemisia arbuscula ssp. longicaulis Shrubland Alliance**
- A59b.** Vegetation is not dominated by *Artemisia arbuscula ssp. longicaulis* (Lahontan sagebrush). ..... **A60**
- A60a.** This steppe and shrubland alliance is dominated or codominated by *Artemisia arbuscula ssp. thermopola* (Thermopola little sagebrush), *Artemisia papposa* (Owyhee sage), and/or *Artemisia tripartita ssp. rupicola* (Wyoming threetip sagebrush) in the shrub canopy and is widespread in the Intermountain West, the southern Rocky Mountains, and in the western Great Plains. ....  
**..... A4122 Artemisia arbuscula ssp. thermopola - Artemisia papposa / Festuca idahoensis Steppe & Shrubland Alliance**
- A60b.** This steppe and shrubland alliance is dominated by *Artemisia arbuscula ssp. longiloba* (alkali sagebrush) in the shrub canopy and is widespread in the Intermountain West, the southern Rocky Mountains, and in the western Great Plains. ....  
**..... A3221 Artemisia arbuscula ssp. longiloba Steppe & Shrubland Alliance**

- A61a.** This steppe and shrubland alliance is dominated or dominated by *Artemisia nova* (black sagebrush) and occurs at intermediate elevations (1400-2500 m) in the Intermountain West and Rocky Mountains. ....  
..... **A3222 Artemisia nova Steppe & Shrubland Alliance**
- A61b.** Vegetation is not dominated or codominated by *Artemisia nova* (black sagebrush). ..... **A62**
- A62a.** This steppe and shrubland alliance is dominated by *Artemisia bigelovii* (Bigelow sage) and occurs in southern and central New Mexico, the Colorado Plateau near canyon rims, and southern Great Plains along escarpments.....  
..... **A3223 Artemisia bigelovii Steppe & Shrubland Alliance**
- A62b.** This alliance is dominated by the dwarf-shrub *Artemisia frigida* (prairie sagewort) and is described from the Colorado Plateau and western slope of the southern Rocky Mountains. ....  
..... **A2565 Artemisia frigida Dwarf-shrubland Alliance**
- G307 Columbia Plateau Scabland Dwarf-shrubland**
- A63a.** Vegetation is dominated by one of several species of *Eriogonum* (buckwheat) dwarf-shrubs. *Artemisia rigida* (scabland sagebrush) and *Salvia dorrii* (purple sage) is typically absent. .... **A64**
- A63b.** Vegetation is dominated by *Artemisia rigida* (scabland sagebrush) or *Salvia dorrii* (purple sage). *Eriogonum* (buckwheat) species may codominate. .... **A65**
- A64a.** This minor dwarf-shrubland alliance is dominated by dwarf-shrub *Eriogonum microthecum* (slender buckwheat) and occurs in portions of the Snake and Imnaha river canyons in Idaho and eastern Oregon and Washington. *Eriogonum microthecum* (slender buckwheat) occurs widely in the interior Western US so this alliance may occur more widely. ....  
..... **A1107 Eriogonum microthecum Dwarf-shrubland Alliance**
- A64b.** This dwarf-shrub steppe alliance is characterized by one or more *Eriogonum* (buckwheat) dwarf-shrub species including *Eriogonum compositum* (arrowleaf buckwheat), *Eriogonum douglasii* (Douglas' buckwheat), *Eriogonum niveum* (snow buckwheat), *Eriogonum sphaerocephalum* (rock buckwheat), *Eriogonum strictum* (Blue Mountain buckwheat), and *Eriogonum thymoides* (thymeleaf buckwheat). Stands occur in the Columbia Basin of eastern Washington, eastern Oregon, Idaho and western Wyoming. ....  
..... **A1568 Eriogonum spp. / Poa secunda Dwarf-shrub Steppe Alliance**
- A65a.** This steppe and shrubland alliance is characterized by a woody layer of scattered *Artemisia rigida* (scabland sagebrush) and occurs in scablands east of the Cascade Range in the Columbia Basin steppe and on the Snake River plateau of Oregon, Washington and Idaho. ....  
..... **A1574 Artemisia rigida Steppe & Shrubland Alliance**
- A65b.** This dwarf-shrub steppe alliance is characterized by the dominance of where *Salvia dorrii* (purple sage) is the dwarf-shrub layer. Stands occur in Oregon in the High Lava Plains, and the southern canyonlands of the Columbia Basin and at isolated spots throughout the Blue Mountains. .... **A1129 Salvia dorrii Dwarf-shrubland Alliance**



## 6.B.1 Temperate & Boreal Cliff, Scree & Other Rock Vegetation

### D052 Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation

**M1a.** This temperate and boreal sparsely vegetated rock outcrop and cliff face macrogroup is characterized by patchy vegetated fractures in the rock surface and less steep or more stable slopes that are composed of scattered trees and/or shrubs. Mosses or lichens may be very dense, well-developed and display cover well over 10% cover. Stands occur in the Coast Mountains of British Columbia to northwestern Oregon. .... **G2**

### M887 Western North American Cliff, Scree & Rock Vegetation

**M1b.** There is only one macrogroup in this division. There is an analogous macrogroup for eastern North America.

### M887 Western North American Cliff, Scree & Rock Vegetation

**G2a.** This group consists of dry barren and sparsely vegetated rock outcrops and cliff faces of the Rocky Mountains and higher elevation plateaus and ranges in the interior western US, and Cascade Range where there is often very high cover of nonvascular lichens and, in wetter places, mosses. Characteristic trees include species from the surrounding landscape, such as *Pseudotsuga menziesii* (Douglas-fir), *Pinus ponderosa* (ponderosa pine), *Pinus flexilis* (limber pine), *Populus tremuloides* (quaking aspen), *Abies concolor* (white fir), *Abies lasiocarpa* (subalpine fir), or *Pinus edulis* (two-needle pinyon) and *Juniperus* (juniper) spp. at lower elevations. There may be scattered shrubs present, such as species of *Holodiscus* (oceanspray), *Ribes* (currant), *Physocarpus* (ninebark), *Rosa* (rose), *Juniperus* (juniper), and *Jamesia americana* (fivepetal cliffbush), *Mahonia repens* (creeping barberry), *Rhus trilobata* (skunkbush sumac), or *Amelanchier alnifolia* (Saskatoon serviceberry). .... **A3**

..... **G565 Rocky Mountain Cliff, Scree & Rock Vegetation**

**G2b.** This vegetation consists of dry barren and sparsely vegetated rock outcrops and cliff faces from elsewhere in Western North America including Californian, Southern Vancouverian, Northern Vancouverian, Western Boreal provinces ..... **G563 Californian Cliff, Scree & Rock Vegetation\***

..... **G573 Southern Vancouverian Cliff, Scree & Rock Vegetation\***

..... **G318 North Vancouverian Montane Bedrock, Cliff & Talus Vegetation\***

..... **G822 Western North American Boreal Cliff & Rock Vegetation\***

### G565 Rocky Mountain Cliff, Scree & Rock Vegetation

**A3a.** These wooded scree communities are characterized by *Picea engelmannii* (Engelmann spruce) as the dominant mature tree species and occur on steep slopes of any exposure in the southern Rocky Mountains of southern Colorado and northern New Mexico.....

..... **A0556 Picea engelmannii Rock Alliance\***

**A3b.** Vegetation is not as above. *Picea engelmannii* (Engelmann spruce) is typically absent..... **A4**

**A4a.** Sparsely vegetated areas dominated by various forbs and graminoids occupying cliffs, outcrops and scree areas of the Colorado and Wyoming Rocky Mountains in subalpine to alpine settings. Characteristic shrubs may include *Artemisia frigida* (prairie sagewort), *Chrysothamnus viscidiflorus* (yellow rabbitbrush), *Holodiscus dumosus* (rockspirea), *Purshia tridentata* (antelope bitterbrush), *Rhus trilobata* (skunkbush sumac), and *Ribes cereum* (wax currant). The most consistent dominant herbaceous species include *Aletes anisatus* (Rocky Mountain Indian parsley), *Aquilegia caerulea* (Colorado blue columbine), *Cirsium scopulorum* (mountain thistle), *Claytonia megarhiza* (alpine springbeauty), *Heuchera bracteata* (bracted alumroot), *Heuchera parvifolia* (littleleaf alumroot), and *Scutellaria brittonii* (Britton's skullcap). Elevations range from 1800 to >3900 m. ....

.... **A3740 Aletes anisatus - Holodiscus dumosus - Rubus idaeus Cliff, Scree & Rock Alliance\***

**A4b.** Vegetation is not as above. .... **A5**

**A5a.** Sparse cliff, scree and rock outcrop vegetation of the northern Rocky Mountains. The most common dominants include *Aquilegia flavescens* (yellow columbine), *Penstemon ellipticus* (rocky ledge penstemon), *Phacelia hastata* (silverleaf phacelia) and *Senecio megacephalus* (rocky ragwort). ... **A3741 Aquilegia flavescens - Phacelia hastata Cliff, Scree & Rock Alliance**

**A5b.** Vegetation is not as above. *Aquilegia flavescens* (yellow columbine), *Penstemon ellipticus* (rocky ledge penstemon), *Phacelia hastata* (silverleaf phacelia) and *Senecio megacephalus* (rocky ragwort) are typically absent..... **A6**

**A6a.** This alliance is characterized by sparsely vegetated rock, cliff and scree areas of the Black Hills. Vegetation is dominated by widely spaced woody species of trees and shrubs. Common dominant trees include *Pinus ponderosa* (ponderosa pine) and *Juniperus scopulorum* (Rocky

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

Mountain juniper). *Arctostaphylos uva-ursi* (kinnikinnick) and *Juniperus communis* (common juniper) are the most common dwarf-shrub species. Depending on the site, ferns, forbs or graminoids may dominate the sparse herbaceous layer. Common dominants include *Achillea millefolium* (common yarrow), *Carex inops ssp. heliophila* (sun sedge), *Campanula rotundifolia* (bluebell bellflower), and *Woodsia oregana* (Oregon cliff fern). Few vascular plants grow in this community, although lichens are common. ....

..... **A3742 Black Hills Cliff, Scree & Rock Alliance\***

**A6b.** Seepage areas along vertical rockfaces, vertical to sloped rockwalls at the base of waterfalls, and large rocks and boulders kept wet by spray from nearby turbulent waterflow (e.g., cascading streamflow or churning of plunge pools at the base of waterfalls). They have a water regime ranging from seasonally to perennially wet but a minimum duration of wetness is needed to maintain these communities. This alliance is found in montane to alpine regions of the Rocky Mountain cordillera, from southern New Mexico north into Montana, Idaho, northeast Washington, Alberta and British Columbia, and west into the lower elevations and mountain ranges within the Intermountain West region. ....

..... **A4146 *Sullivantia hapemanii* - *Mimulus* spp. Wet Rock Alliance**

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\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

Key to USNVC Wetland and Riparian Macrogroups, Groups and Alliances in the Northern Basins and Range and Columbia Plateau Ecoregions

1.B.3 Temperate Flooded & Swamp Forest

D195 Rocky Mountain-Great Basin Montane Flooded & Swamp Forest

**M1a.** Montane riparian and swamp forests and woodlands dominated by cottonwoods, conifers, or a mix with such species as *Acer negundo* (box-elder), *Alnus rhombifolia* (white alder), *Picea engelmannii* (Engelmann spruce), *Picea pungens* (blue spruce), *Pinus contorta* (lodgepole pine), *Pinus ponderosa* (ponderosa pine), *Populus angustifolia* (narrowleaf cottonwood), *Populus balsamifera* (balsam poplar), or *Thuja plicata* (western red-cedar). Throughout the Great Basin and Rocky Mountains. .... **G2**  
..... **M034 Rocky Mountain-Great Basin Montane Riparian & Swamp Forest**

**M1b.** There is only one macrogroup within this division.

M034 Rocky Mountain-Great Basin Montane Riparian & Swamp Forest

**G2a.** Riparian areas dominated by *Populus balsamifera* (balsam poplar). Other trees present may include *Populus tremuloides* (aspen) and several conifer species..... **A4**  
..... **G796 Northern Rocky Mountain Lowland-Foothill Riparian Forest**

**G2b.** Wetlands or riparian areas dominated by conifer trees or by other deciduous tree species..... **G3**

**G3a.** Conifer dominated wetland group; *Thuja plicata* (western red-cedar) and/or *Picea engelmannii* (Engelmann spruce) with an obligate wetland herbaceous understory such as *Lysichiton americanus* (American skunkcabbage). Very poorly drained soils that are saturated year-round or may have seasonal flooding in the spring. Northern Rocky Mountains; northwestern Wyoming into the Canadian Rockies; eastern Oregon and Washington. .... **A5**  
..... **G505 Rocky Mountain-Great Basin Swamp Forest**

**G3b.** Seasonally flooded conifer- or broadleaf-dominated forests, montane to subalpine elevations; *Picea engelmannii* (Engelmann spruce), *Picea pungens* (blue spruce), and/or *Populus angustifolia* (narrowleaf cottonwood), occasionally *Populus tremuloides* (quaking aspen). Understory dominated by forbs or graminoids with few shrubs. Soils are mineral and very well-oxygenated. Rocky Mountain cordillera, southern New Mexico into Montana, Intermountain West region and the Colorado Plateau. .... **A6**  
..... **G506 Rocky Mountain-Great Basin Montane Riparian & Swamp Forest**

G796 Northern Rocky Mountain Lowland-Foothill Riparian Forest

**A4a.** Riparian woodlands dominated by *Populus balsamifera* (balsam poplar)..... **A0311 Populus balsamifera ssp. trichocarpa Northern Rocky Mountain Riparian Forest Alliance**

**A4b.** There is only one alliance within this group.

G505 Rocky Mountain-Great Basin Swamp Forest

**A5a.** Seasonally flooded conifer-dominated forests; species such as *Thuja plicata* (western red-cedar) and/or *Tsuga heterophylla* (western hemlock). Other trees may include *Pseudotsuga menziesii* (Douglas-fir), *Abies grandis* (grand fir), and *Abies lasiocarpa* (subalpine fir). Riparian areas and toeslopes saturated throughout the growing season. Marine-influenced interior mountains of northeastern Washington, northern Idaho, southeastern British Columbia and northwestern Montana west of the Continental Divide. ....  
..... **A3776 Thuja plicata - Tsuga heterophylla Rocky Mountain Swamp Forest Alliance**

**A5b.** Riparian wetlands dominated by *Picea engelmannii* (Engelmann spruce), *Picea glauca* (white spruce), and their hybrids. *Betula papyrifera* (paper birch) is occasionally present. Montana, Wyoming and Idaho..... **A3775 Picea engelmannii Swamp Forest Alliance**

G506 Rocky Mountain-Great Basin Montane Riparian & Swamp Forest

**A6a.** Dominated by deciduous trees such as narrowleaf cottonwoods (*Populus angustifolia*), aspen (*Populus tremuloides*), and/or Box elder (*Acer negundo*)..... **A7**

**A6b.** Stands dominated by conifers ..... **A9**

**A7a.** Riparian and swamp woodlands dominated by *Acer negundo* (Box elder), *Alnus* spp. (alder) and/or *Cornus sericea* (red Osier dogwood). ....  
..... **A4154 Acer negundo - Alnus incana ssp. tenuifolia - Cornus sericea Riparian Woodland Alliance**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- A7b.** Riparian forests dominated by *Populus angustifolia* (narrowleaf cottonwood) and/or *Populus tremuloides* (quaking aspen). Widely distributed, Rocky Mountains from Alberta south to New Mexico, Great Basin ranges and in the Sierra Nevada.....**A8**
- A8a.** Riparian woodlands dominated by *Populus angustifolia* (narrowleaf cottonwood) alone or mixed with other trees. Narrow stream terraces and large floodplains.....  
..... **A3759 Populus angustifolia Riparian Forest Alliance**
- A8b.** Stands of *Populus tremuloides* (quaking aspen) that are truly wetlands or riparian; sometimes other trees are codominant, such as *Populus angustifolia* (narrowleaf cottonwood), *Abies concolor* (white fir), *Pinus ponderosa* (ponderosa pine), and *Picea pungens* (blue spruce). Open stands with a shrub layer of wet-site indicators such as *Alnus incana* (gray alder), *Cornus sericea* (red-osier dogwood), and *Salix* (willow) spp. Riparian zones or sometimes near lakes where the ground is flooded or saturated in the spring. ....  
..... **A3760 Populus tremuloides Riparian Forest Alliance**
- A9a.** Riparian woodlands or forests dominated by *Pinus contorta* (lodgepole pine) or *Abies grandis* (grand fir). Usually with other conifers such as *Abies lasiocarpa* (subalpine fir), *Larix occidentalis* (western larch), *Pinus monticola* (western white pine), *Pseudotsuga menziesii* (Douglas-fir), *Abies x shastensis* (Shasta red fir), *Picea engelmannii* (Engelmann spruce), *Pinus flexilis* (limber pine), or *Tsuga mertensiana* (mountain hemlock). .....**A10**
- A9b.** Riparian woodland or forests dominated by *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Picea pungens* (blue spruce), *Pinus ponderosa* (ponderosa pine), *Juniperus scopulorum* (Rocky Mountain juniper), and/or *Abies concolor* (white fir). .**A11**
- A10a.** Riparian woodland alliance characterized by *Pinus contorta* (lodgepole pine). Associated conifers may include *Abies grandis* (grand fir), *Abies lasiocarpa* (subalpine fir), *Abies x shastensis* (Shasta red fir), *Picea engelmannii* (Engelmann spruce), *Pinus flexilis* (limber pine), or *Tsuga mertensiana* (mountain hemlock). Upper montane riparian or wetland areas; flat, wet, relatively cold sites such as margins of meadows, lake or forest basins, and along valley bottoms in the Rocky Mountains and Sierra Nevada. ....  
 . **A3758 Pinus contorta var. murrayana - Pinus contorta var. latifolia Swamp Forest Alliance**
- A10b.** Riparian areas dominated by *Abies grandis* (grand fir), usually with other conifers. *Abies lasiocarpa* (subalpine fir), *Larix occidentalis* (western larch), *Pinus monticola* (western white pine), and *Pseudotsuga menziesii* (Douglas-fir) may be present. *Betula papyrifera* (paper birch) or *Populus balsamifera ssp. trichocarpa* (black cottonwood) may form a scattered subcanopy. Benches, toeslopes or valley bottoms along mountain streams in the Rocky Mountains of western Montana, Idaho and eastern Washington and eastern Oregon, possibly extending into British Columbia. ....  
..... **A3762 Abies grandis Rocky Mountain Riparian Forest Alliance**
- A11a.** Subalpine riparian or seep slope conifer forests; characterized by *Abies lasiocarpa* (subalpine fir) and *Picea engelmannii* (Engelmann spruce). Other conifer species may include *Picea engelmannii x glauca*, *Picea glauca* (white spruce), *Pinus contorta* (lodgepole pine), and *Tsuga mertensiana* (mountain hemlock). Found in landscape positions where snowmelt moisture creates shallow water tables, seeps, or streamside flooding during much of the growing season..... **A3757 Abies lasiocarpa - Picea engelmannii Swamp Forest Alliance**
- A11b.** Lower elevation riparian areas, not like above in all respects .....**A12**
- A12a.** Riparian areas with a dominance of *Picea pungens* (blue spruce). Common associates include *Abies concolor* (white fir), *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Pinus contorta* (lodgepole pine), *Pinus ponderosa* (ponderosa pine), and *Pseudotsuga menziesii* (Douglas-fir) (which may replace *Picea pungens* (blue spruce)). *Populus angustifolia* (narrowleaf cottonwood) or *Populus tremuloides* (quaking aspen) can be common. Middle elevations of the central and southern Rocky Mountains and Colorado Plateau. Narrow or V-shaped valleys and canyons subject to cold-air drainage and limited sunlight. They occupy streambanks, terraces, narrow floodplains or benches, and subirrigated toeslopes; stream gradients are often steep. ....  
..... **A3761 Picea pungens Riparian Forest Alliance**
- A12b.** Conifer-dominated, low-elevation riparian areas characterized by *Pinus ponderosa* (ponderosa pine), *Juniperus scopulorum* (Rocky Mountain juniper), and/or *Abies concolor* (white fir). Can occur as broad, extensive stands on wider floodplain terraces or as narrow, long ribbons. Found throughout the Rocky Mountains, south into Arizona and New Mexico, and west into eastern mountain valleys of Washington and Oregon.....

..... A3797 *Pinus ponderosa* - *Juniperus scopulorum* - *Abies concolor* Riparian Woodland Alliance

## D013 Western North American Interior Flooded Forest

**M1a.** Macrogroup of low-elevation riparian and lacustrine areas of western U.S. and into Mexico; dominated by non-native invasive woody species such as *Tamarix* (tamarisk) spp., *Elaeagnus angustifolia* (Russian olive), *Phoenix dactylifera* (date palm), *Salix alba* (white willow) and/ or *Salix fragilis* (crack willow). Includes stands dominated by native tree species such as *Acer negundo* (box elder) and *Populus* spp. (cottonwood), with understories of non-native species. ....G2

..... **M298 Interior West Ruderal Flooded & Swamp Forest & Woodland**

**M1b.** Riparian and wetland forested vegetation of lowlands of southwestern U.S., Mediterranean California and Tamaulipan area of southern Texas. Dominant tree species include *Acacia farnesiana* (sweet acacia), *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Ebenopsis ebano* (Texas ebony), *Juglans major* (Arizona walnut), *Platanus wrightii* (Arizona sycamore), *Populus deltoides* ssp. *wislizeni* (Rio Grande cottonwood), *Populus deltoides* ssp. *monilifera* (eastern cottonwood), *Populus fremontii* (Fremont cottonwood), *Platanus racemosa* (California sycamore), *Prosopis velutina* (velvet mesquite), *Salix gooddingii* (Goodding's willow), and *Salix laevigata* (red willow). Also includes oases dominated by evergreen palms *Washingtonia filifera* (California fan palm) or *Sabal mexicana* (Rio Grande palmetto). ....G3

..... **M036 Interior Warm & Cool Desert Riparian Forest**

### M298 Interior West Ruderal Flooded & Swamp Forest & Woodland

**G2a.** Dominated by non-native invasive woody species such as *Tamarix* (tamarisk) spp., *Elaeagnus angustifolia* (Russian olive), and others. There is only one group in this macrogroup. ....A4

..... **G510 Interior West Ruderal Riparian Forest & Scrub**

**G2b.** Riparian forests dominated by native species and is not like above in all respects.....G3

### M036 Interior Warm & Cool Desert Riparian Forest

**G3a.** Riparian woodland group dominated by tree and tall arborescent shrubs such as *Acer negundo* (box elder), *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Cephalanthus occidentalis* (common buttonbush), *Fraxinus velutina* (velvet ash), *Juglans major* (Arizona walnut), *Platanus wrightii* (Arizona sycamore), *Populus deltoides* (eastern cottonwood), *Populus fremontii* (Fremont cottonwood), *Platanus racemosa* (California sycamore), *Quercus lobata* (valley oak), *Salix gooddingii* (Goodding's willow), *Salix laevigata* (red willow), *Sapindus saponaria* (wingleaf soapberry), and *Washingtonia filifera* (California fan palm). ....A9

..... **G797 Western Interior Riparian Forest & Woodland**

**G3b.** Other groups in this macrogroup do not occur in the CBR key area.

### G510 Interior West Ruderal Riparian Forest & Scrub

**A4a.** Stands dominated by *Tamarix* (tamarisk) and/or *Elaeagnus angustifolia* (Russian olive). ....A5

**A4b.** Stands dominated by other species. ....A6

### G510 Interior West Ruderal Riparian Forest & Scrub

**A5a.** Dominated by introduced species of *Tamarix* (tamarisk), including *Tamarix chinensis* (five-stamen tamarisk), *Tamarix gallica* (French tamarisk), *Tamarix parviflora* (smallflower tamarisk), and *Tamarix ramosissima* (saltcedar). Moderately dense to dense thickets on banks of larger streams, rivers and playas across the southwestern U.S. and northern Mexico. .... **A0842 Tamarix spp. Ruderal Riparian Scrub Alliance**

**A5b.** Alliance dominated by the introduced and naturalized tree species *Elaeagnus angustifolia* (Russian olive) with a variety of native and introduced species in the shrub and herbaceous layers. Widespread throughout much of the western United States; seeds are spread by birds. Occurs in a variety of mesic areas, such as near streams and rivers, upland basins and drainages. .... **A3566 Elaeagnus angustifolia Ruderal Riparian Scrub Alliance**

**A6a.** Stands dominated by *Acer negundo* (box elder), *Populus* spp. (cottonwood), *Picea* spp (spruce species), or *Salix fragilis* (crack willow). ....A7

**A6b.** Stands dominated by other species. ....A8

**A7a.** Riparian forests dominated by *Acer negundo* (box elder), *Populus* spp. (cottonwood species) or *Picea* spp (spruce species), with non-native understory species such as *Tamarix* (tamarisk), *Bromus tectorum* (cheatgrass), or other introduced species, generally these have high cover. Ruderal type, can occur anywhere along riparian and low wet areas throughout the western US. .... **A4155 Acer negundo - Populus spp. - Picea spp. Ruderal Riparian Forest Alliance**



- A7b.** Naturalized stands of *Salix fragilis* (crack willow) and/or *Salix alba* (white willow) occurring along riverbanks and lakeside margins. Throughout the western U.S. and western Great Plains..... **A4192 Salix alba - Salix fragilis Ruderal Riparian Forest Alliance**
- A8a.** Ruderal shrubland alliance; dominants include *Ficus carica* (edible fig), *Nerium oleander* (oleander), *Caragana arborescens* (Siberian peashrub), *Rubus armeniacus* (Himalayan blackberry), and/or *Sesbania punicea* (rattlebox). Includes planted stands of *Fraxinus velutina* (velvet ash), and *Tamarix aphylla* (Athel tamarisk). Rarely documented. ....  
**..A4160 Rubus armeniacus - Sesbania punicea - Ficus carica Ruderal Riparian Scrub Alliance**
- A8b.** Mesquite scrub with moderate to dense tall woody canopy dominated by *Prosopis glandulosa* (honey mesquite), *Prosopis pubescens* (screwbean mesquite), and/or *Prosopis velutina* (velvet mesquite). Other species are generally exotics such as *Tamarix* (tamarisk) and many non-native herbaceous species, replacing the native understory. Southwestern US from California to Texas and in Chihuahua and Coahuila, Mexico. Mesic areas such as floodplains, streambanks, intermittently flooded arroyo terraces, alkali sinks and washes, and dry terraces above streams and arroyos. ....  
**..... A4218 Prosopis spp. Lowland Ruderal Understory Wet Scrub Alliance**
- G797 Western Interior Riparian Forest & Woodland**
- A9a.** Riparian woodlands dominated by *Populus* (cottonwood) species. ....**A10**
- A9b.** Riparian woodlands dominated by other woody species .....**A12**
- A10a.** Stands dominated by *Populus fremontii* (Fremont cottonwood), known from throughout CA, southern and central NV, northern and western Arizona, and western Utah.....**A11**
- A10b.** Stands not like above in all respects.....**A12**
- A11a.** Riparian woodlands in the cool deserts of the Great Basin dominated by *Populus fremontii* (Fremont cottonwood). Along stream channels on alluvial fans, in lower canyons in desert mountains, and valleys with annually variable but dependable subsurface groundwater. ....  
**..... A0644 Populus fremontii Great Basin Riparian Forest Alliance**
- A11b.** Other alliances in this group do not occur in Central Basin and Range key area.
- A12a.** Woodland alliance dominated by *Populus deltoides ssp. wislizeni* (Rio Grande cottonwood), *Populus deltoides ssp. monilifera* (eastern cottonwood), or *Salix amygdaloides* (peachleaf willow). Other trees include *Acer negundo* (box elder). Alluvial floodplains, terraces and streambanks of rivers and streams, and sometimes around lakes and ponds; Wyoming, Colorado, New Mexico, and the Colorado Plateau of Utah. ....  
**..... A3798 Populus deltoides ssp. wislizeni - Populus deltoides ssp. monilifera - Salix amygdaloides Riparian Woodland Alliance**
- A12b.** Riparian woodland alliance dominated by *Acer negundo* (box elder), *Fraxinus anomala* (singleleaf ash), and/or *Celtis laevigata var. reticulata* (netleaf hackberry). Common associates include *Alnus incana* (gray alder), *Betula occidentalis* (water birch), *Brickellia* spp. (brickellbush), *Cornus sericea* (red-osier dogwood), *Quercus gambelii* (Gambel oak), *Rhus trilobata* (skunkbush sumac), and others. Intermittently dry streams or in slickrock canyons; Colorado Plateau and south into Arizona and New Mexico. ....  
**.....A3796 Acer negundo - Fraxinus anomala - Celtis laevigata var. reticulata Riparian Woodland Alliance\***

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

**D193 Vancouverian Flooded & Swamp Forest**

**M1a.** Forested wetlands of coastal lowlands and mountains from Oregon north into southern Alaska. It includes cottonwood and conifer dominated riparian forests, conifer swamps, and treed peatlands (fens and bogs). Dominance by *Alnus rubra*, *Chamaecyparis nootkatensis*, *Fraxinus latifolia*, *Picea sitchensis*, *Pinus contorta* var. *contorta*, *Populus balsamifera* ssp. *trichocarpa*, *Salix lucida* ssp. *lasiandra*, *Tsuga heterophylla*, *Thuja plicata*, or *Tsuga mertensiana*, and herbaceous indicators of the saturated or floodplain soil conditions such as *Carex deweyana*, *Lysichiton americanus*, *Rubus spectabilis*, *Trichophorum caespitosum*, and/or *Sphagnum* species. Montane riparian areas are more often conifer-dominated by such species as *Abies amabilis*, *Abies concolor*, *Abies magnifica*, *Pinus contorta* var. *murrayana*, *Populus tremuloides*, and/or *Tsuga mertensiana*. In bogs at a variety of elevations *Chamaecyparis nootkatensis*, *Picea sitchensis*, *Pinus contorta* var. *contorta*, *Tsuga heterophylla*, and *Tsuga mertensiana* are some of the common characteristic tree species. ....**G2**  
..... **M035 Vancouverian Flooded & Swamp Forest**

**M1b.** There are no other macrogroups in this division.

**M035 Vancouverian Flooded & Swamp Forest**

**G2a.** This riparian woodland group occurs throughout mountainous areas of the Pacific Northwest coast and Cascade Range into the Sierra Nevada foothills of California. Dominant species include *Abies amabilis*, *Abies concolor*, *Abies magnifica*, *Alnus rhombifolia*, *Alnus rubra*, *Pinus contorta* var. *murrayana*, *Pinus jeffreyi*, *Populus balsamifera* ssp. *trichocarpa*, *Populus tremuloides*, and *Tsuga mertensiana*. ....**A3**  
..... **G507 North Pacific Montane Riparian Woodland**

**G2b.** There is only one Group in this geography within this Macrogroup

**G507 North Pacific Montane Riparian Woodland**

**A3a.** Riparian or swamp woodland dominated by deciduous species such as *Alnus rhombifolia*, *Populus tremuloides* or *Alnus rubra*. ....**A4**

**A3b.** Riparian or swamp woodlands dominated by conifer tree species such as *Tsuga mertensiana*, *Abies amabilis*, or *Picea engelmannii* .....**A5**

**A4a.** Riparian areas where the upper canopy is dominated by *Alnus rhombifolia*. Few other trees except for conifers from neighboring upslopes may be included, such as *Abies grandis*. Stands often have a subcanopy shrub layer with *Amelanchier alnifolia*, *Betula occidentalis*, *Celtis laevigata* var. *reticulata*, *Philadelphus lewisii*, *Prunus virginiana*, *Rosa woodsii*, and *Sambucus caerulea*. It occurs in ravines and draws of the coastal and interior valleys of the Columbia River of Oregon and Washington, into the Snake and Salmon river canyons of Idaho, south into central and eastern Oregon, and into the west side of the Cascade Range and eastern side of the Coast Ranges. Elevation range is 100 to 1000 m (500-3280 feet), with a rough average of 500 to 800 m (1640-2624 feet).....  
.....**A0306 Alnus rhombifolia Cascadian Riparian Woodland Alliance**

**A4b.** Riparian woodlands with a deciduous tree-dominated canopy of *Alnus rubra* and/or *Populus tremuloides*. Understory shrub associates include *Acer glabrum*, *Rosa gymnocarpa*, *Rubus parviflorus*, *Symphoricarpos mollis*, and *Vaccinium membranaceum*. Herbaceous species with a strong affinity to the community are *Adiantum pedatum*, *Anemone piperi*, *Asarum caudatum*, *Athyrium filix-femina*, *Circaea alpina*, *Clintonia uniflora*, *Coptis occidentalis*, *Cornus canadensis*, *Gymnocarpium dryopteris*, *Polystichum munitum*, *Streptopus amplexifolius*, and *Tiarella trifoliata* var. *unifoliata* (= *Tiarella unifoliata*). Stands occur along montane (below alpine and above foothill) riparian areas, wetlands and seeps in the Cascade Range and as far east as the Blue Mountains of the Pacific Northwest.....  
.....**A3768 Populus tremuloides - Alnus rubra Swamp Forest Alliance**

**A5a.** Swamp woodlands dominated typically mixed forests with several conifers in the overstory often dominated by *Tsuga mertensiana* and/or *Abies amabilis*. Additional tree species include *Chamaecyparis nootkatensis*, *Pseudotsuga menziesii*, *Thuja plicata* and *Tsuga heterophylla*. The shrub layer is moderately dense and is dominated by *Acer circinatum*, *Menziesia ferruginea*, *Oplopanax horridus*, *Ribes bracteosum*, *Rubus parviflorus*, *Rubus pedatus*, *Rubus spectabilis*, *Vaccinium deliciosum*, *Vaccinium membranaceum*, and/or *Vaccinium ovalifolium*. These forests typically occur in subalpine habitats near the ecotone with subalpine parklands. Sites are cold, poorly drained and saturated because of shallow

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

subirrigation, seeps, springs or small streams. This alliance is found in the Coastal Mountains of British Columbia, and Coast and Cascade ranges of Oregon and Washington. ....  
 .....**A3766 Tsuga mertensiana - Abies amabilis Swamp Woodland Alliance**

**A5b.** These riparian/wetland woodland alliance are dominated by conifers, with tree canopy cover ranging from 30-70%. *Picea engelmannii* is always present in the canopy and usually is dominant. *Pinus contorta* is often present and can be codominant, while *Abies lasiocarpa* is only occasional and is not abundant. A low-shrub layer is often present, dominated by *Vaccinium uliginosum*, *Vaccinium caespitosum*, and *Spiraea douglasii*, with *Ledum glandulosum*, *Linnaea borealis*, *Lonicera caerulea*, *Salix boothii*, *Salix eastwoodiae*, *Salix geyeriana*, *Salix lemmonii*, or *Vaccinium membranaceum* occasionally present. The herbaceous layer is dominated by perennial sedges or forbs. The most common or abundant graminoids include *Calamagrostis canadensis*, *Carex aquatilis*, *Carex jonesii*, *Carex scopulorum* var. *prionophylla*, *Carex scopulorum*, *Deschampsia caespitosa*, and *Eleocharis quinqueflora*. Important forbs include *Clintonia uniflora*, *Dodecatheon* spp., *Equisetum arvense*, *Pedicularis groenlandica*, *Saxifraga oregana*, *Streptopus amplexifolius*, and *Trifolium longipes*. Mosses are abundant and in some stands form peaty mats; *Sphagnum* spp. are the most important. This alliance is found in the Cascade Range of Oregon, Washington, and possibly reaching into British Columbia. ....  
 .....**A3767 Picea engelmannii Cascadian Swamp Woodland Alliance**

## 2.C.2 Temperate to Polar Bog & Fen

### D029 North American Bog & Fen

**M1a.** Alkaline fens on peatlands across the boreal regions of North America, extending south into sub-boreal regions of the Rocky Mountains, Great Lakes, and northeastern and north-central U.S. *Sphagnum* (sphagnum) peatmoss and ericaceous shrubs are patchy to absent and brown mosses, broad-leaved non-ericaceous shrubs, and thin-leaved graminoids are common. ....**G2**  
 ..... **M877 North American Boreal & Sub-boreal Alkaline Fen**  
**M1b.** There is only one macrogroup within this division in the range of this key.

### M877 North American Boreal & Sub-boreal Alkaline Fen

**G2a.** Dominated by graminoids and low shrubs: *Carex buxbaumii* (Buxbaum's sedge), *Carex cusickii* (Cusick's sedge), *Carex limosa* (mud sedge), *Carex saxatilis* (rock sedge), *Carex utriculata* (Northwest Territory sedge), *Kobresia myosuroides* (Bellardi bog sedge), and *Kobresia simpliciuscula* (simple bog sedge). Shrubs include *Betula glandulosa* (resin birch), *Betula nana* (dwarf birch) and several *Salix* (willow) spp. Fens with groundwater discharge, soil chemistry (neutral to alkaline), and peat accumulation of at least 40 cm. Rocky Mountains from Colorado north into Canada. ....**A3**  
 ..... **G516 Rocky Mountain Alkaline Fen**  
**G2b.** Only one group within this Macrogroup

### G516 Rocky Mountain Alkaline Fen

**A3a.** *Betula nana* (dwarf birch) is an indicator for the shrubby growth form on these fens; however, other shrub species may be dominant. There is usually herbaceous cover, and dense mosses cover the ground. Shrub-dominated neutral to alkaline pH fens (organic soil wetlands) found at elevations of 1500-3350 m (5000-11,000 feet) within the Rocky Mountains..... **A3434 Betula nana Alkaline Shrub Fen Alliance**  
**A3b.** Herbaceous dominated fens, not like above.....**A4**  
**A4a.** Herbaceous fens dominated by one or more *Carex* (sedge) species. Some well-documented species include *Carex buxbaumii* (Buxbaum's sedge), *Carex cusickii* (Cusick's sedge), *Carex limosa* (mud sedge), and *Carex saxatilis* (rock sedge). *Carex aquatilis* (water sedge) and *Carex utriculata* (Northwest Territory sedge) may be present as well. Fens are seasonally or permanently saturated wetlands with an organic substrate that is at least 30 cm thick, and are neutral to alkaline.....  
 ..... **A3435 Carex limosa - Carex buxbaumii - Triglochin maritima Alkaline Graminoid Fen Alliance**  
**A4b.** Strongly alkaline fens characterized by herbaceous species *Kobresia myosuroides* (Bellardi bog sedge) and *Kobresia simpliciuscula* (simple bog sedge), the later indicating extremely rich conditions. The water chemistry is distinct in that it contains high levels of calcium and magnesium. Only known in the Rocky Mountains of Colorado, but likely to occur elsewhere in the Rocky Mountains into Canada.....

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

..... A3436 *Kobresia myosuroides* - *Kobresia simpliciuscula* Alkaline Graminoid Fen Alliance

## 2.C.4 Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland

### D031 Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland

**M1a.** Montane to alpine wet meadows, marshes and wet shrublands. Dominant graminoids such as *Calamagrostis canadensis* (bluejoint), *Carex scopulorum* (mountain sedge), *Carex utriculata* (Northwest Territory sedge), *Glyceria striata* (fowl mannagrass), forbs such as *Caltha leptosepala* (white marsh-marigold), *Dodecatheon jeffreyi* (Sierra shootingstar), *Sibbaldia procumbens* (creeping sibbaldia), and shrubs such as, but not limited to, *Alnus incana* (gray alder), *Betula occidentalis* (water birch), *Betula glandulosa* (resin birch), and many *Salix* (willow) species. Throughout the Rocky Mountains of the U.S. and Canada, the Sierra Nevada, and Intermountain cordillera. ....G3

..... M075 Western North American Montane-Subalpine-Boreal Marsh, Wet Meadow & Shrubland

**M1b.** Wetlands not like above in all respects.....M2

**M2a.** Disturbed natural wetland habitats of temperate western U.S. that are strongly dominated by non-native and sometimes weedy or generalist native species. Non-native species may include *Agrostis gigantea* (redtop), *Agrostis stolonifera* (creeping bentgrass), *Alopecurus pratensis* (meadow foxtail), *Arundo donax* (giant reed), *Cirsium arvense* (Canada thistle), *Conyza canadensis* (Canadian horseweed), *Lolium arundinaceum* (tall fescue), *Lactuca serriola* (prickly lettuce), *Phalaris arundinacea* (reed canarygrass), *Phragmites australis* (common reed), *Poa palustris* (fowl bluegrass), *Poa pratensis* (Kentucky bluegrass), and *Sonchus* (sowthistle) spp. Native species may be present but are so low in abundance that they are insufficient to identify the native macrogroup or lower units. ....G6

..... M301 Western North American Ruderal Marsh, Wet Meadow & Shrubland

**M2b.** Freshwater marshes found at all elevations below alpine in the semi-arid interior basins and mountains of western U.S., with dominant species such *Carex pellita* (woolly sedge), *Carex praegracilis* (clustered field sedge), *Eleocharis palustris* (common spikerush), *Juncus balticus* (Baltic rush), *Paspalum distichum* (knotgrass), *Schoenoplectus americanus* (chairmaker's bulrush), *Schoenoplectus pungens* (common threesquare), *Typha domingensis* (southern cattail), *Typha latifolia* (broadleaf cattail), and species of *Bidens* (beggarticks), *Cicuta* (water-hemlock), *Cyperus* (flatsedge), *Mimulus* (monkeyflower), and *Phalaris* (canarygrass).....G6

..... M888 Arid West Interior Freshwater Marsh

### M075 Western North American Montane-Subalpine-Boreal Marsh, Wet Meadow & Shrubland

**G3a.** Riparian shrublands, wet meadows and marshes found in montane and higher elevations ....G4

**G3b.** Wetlands dominated by herbaceous species. ....G6

**G4a.** Wetlands at high altitudes. The following 4 groups occur within MG075. They are found at high altitudes; they are listed here for information, but are not keyed, nor are their alliances. ....

..... G547 Western Boreal Alkaline Swamp

..... G528 Western North American Boreal Wet Meadow & Marsh

..... G521 Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh

.....G520 Vancouverian-Rocky Mountain Subalpine-Alpine Snowbed, Wet Meadow & Dwarf-shrubland

**G4b.** Wetlands at lower montane or even subalpine altitudes, are near or adjacent to sage grouse habitat, and are wetland types known to be used by sage grouse. ....G5

**G5a.** Lowland foothill, valley bottom and lower montane riparian shrublands dominated by low to tall shrubs such as *Acer glabrum* (Rocky Mountain maple), *Artemisia* (sagebrush) spp., *Cornus sericea* (red-osier dogwood), *Crataegus* (hawthorn) spp., *Dasiphora fruticosa* ssp. *floribunda* (shrubby-cinquefoil), *Forestiera pubescens* (stretchberry), *Oplopanax horridus* (devil's-club), *Philadelphus lewisii* (Lewis' mock orange), *Prunus virginiana* (chokecherry), *Rhus trilobata* (skunkbush sumac), *Rosa* (rose) spp., *Salix* (willow) spp., *Shepherdia argentea* (silver buffaloberry), and *Symphoricarpos* (snowberry) spp. At and below lower treeline, generally not up in the mountains, but rather in between mountain valleys and lowlands of the Interior West. ....A7

..... G526 Rocky Mountain-Great Basin Lowland-Foothill Riparian Shrubland

**G5b.** Montane to subalpine riparian shrublands; generally dominated by any or a mix of *Alnus incana* (gray alder), *Alnus viridis* (green alder), *Betula glandulosa* (resin birch), *Betula occidentalis* (water birch), *Cornus sericea* (red-osier dogwood), *Salix bebbiana* (Bebb willow), *Salix boothii* (Booth's willow), *Salix brachycarpa* (shortfruit willow), *Salix drummondiana*

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(Drummond's willow), *Salix eriocephala* (Missouri River willow), *Salix geyeriana* (Geyer's willow), *Salix monticola* (park willow), *Salix planifolia* (diamondleaf willow), and/or *Salix wolfii* (Wolf's willow). Occur in steep and narrow to wide, low-gradient valley bottoms and floodplains as well as steep moist avalanche chutes. ....A9  
 ..... **G527 Western Montane-Subalpine Riparian & Seep Shrubland**

**M301 Western North American Ruderal Marsh, Wet Meadow & Shrubland**

**G6a.** Wet meadows dominated by non-native species such as *Agrostis gigantea* (redtop), *Agrostis stolonifera* (creeping bentgrass), *Alopecurus pratensis* (meadow foxtail), *Conyza canadensis* (Canadian horseweed), *Cirsium arvense* (Canada thistle), *Sonchus* (sowthistle) spp., *Lactuca serriola* (prickly lettuce), *Phalaris arundinacea* (reed canarygrass), *Phragmites australis* (common reed), *Poa palustris* (fowl bluegrass), and/or *Poa pratensis* (Kentucky bluegrass) that occur in the same physical settings as native wet meadows found throughout the western U.S. and southern Canada. ....A21  
 ..... **G524 Western North American Ruderal Marsh, Wet Meadow & Shrubland**

**M888 Arid West Interior Freshwater Marsh**

**G6b.** Arid west freshwater marshes dominated by native species such as *Carex pellita* (woolly sedge), *Carex praegracilis* (clustered field sedge), *Eleocharis palustris* (common spikerush), *Juncus balticus* (Baltic rush), *Paspalum distichum* (knotgrass), *Schoenoplectus americanus* (chairmaker's bulrush), *Schoenoplectus pungens* (common threesquare), *Typha domingensis* (southern cattail), *Typha latifolia* (broadleaf cattail), and species of *Bidens* (beggarticks), *Cicuta* (water-hemlock), *Cyperus* (flatsedge), *Mimulus* (monkeyflower), and *Phalaris* (canarygrass). Found at all elevations below alpine in the semi-arid interior basins and mountains of western U.S., including the western Great Plains.....A25  
 ..... **G531 Arid West Interior Freshwater Marsh**

**G526 Rocky Mountain-Great Basin Lowland-Foothill Riparian Shrubland**

**A7a.** Tall riparian shrublands dominated by *Salix exigua* (narrowleaf willow), *Salix irrorata* (dewsystem willow), and/or *Salix melanopsis* (dusky willow). Typically with continuous cover of 60-100%. Along streamsides, marshes and wet ditches throughout the western U.S. ....  
 ..... **A3800 Salix exigua - Salix irrorata Shrubland Alliance**

**A7b.** Riparian shrublands not like above in all respects .....A8

**A8a.** Dominated by *Artemisia cana ssp. viscidula* (silver sagebrush) or *Artemisia cana ssp. bolanderi* (silver sagebrush). In relatively moist environments, including riparian areas, alkaline or saline playa lakes, throughout the northern half of the Intermountain West. ....  
 ..... **A2557 Artemisia cana Wet Shrubland Alliance**

**A8b.** Shrublands dominated by *Corylus cornuta* (beaked hazelnut), *Crataegus rivularis* (river hawthorn), *Elaeagnus commutata* (silverberry), *Forestiera pubescens* (stretchberry), *Rhamnus alnifolia* (alderleaf buckthorn), *Shepherdia argentea* (silver buffaloberry), and/or *Rhus trilobata* (skunkbush sumac). Usually single-species shrublands, small, narrow stands at the base of steep hills and cliffs and along washes and upper benches and terraces of riparian areas in the Rocky Mountains and throughout the cool interior western U.S. Near but not necessarily in the wettest part of riparian areas.....  
 ..... **A3799 Rhus trilobata - Crataegus rivularis - Forestiera pubescens Shrubland Alliance**

**G527 Western Montane-Subalpine Riparian & Seep Shrubland**

**A9a.** Riparian shrublands dominated by non-willows .....A10

**A9b.** Riparian shrublands dominated by *Salix* (willows). .....A14

**A10a.** Riparian shrublands dominated by *Alnus* (alder), *Betula* (birch) and/or *Cornus* (dogwood).....A12

**A10b.** Riparian shrublands dominated by *Crataegus douglasii* (black hawthorn), *Celtis laevigata* var. *reticulata* (netleaf hackberry) and/or *Philadelphus lewisii* (Lewis' mock orange). .....A11

**A11a.** Shrublands dominated by *Crataegus douglasii* (black hawthorn), often forming dense thickets. Lower montane and foothill regions of the Columbia Basin, north and east into the Central Rockies in Idaho and northwestern Wyoming.....  
 ..... **A3974 Crataegus douglasii / Symphoricarpos albus Wet Shrubland Alliance**

**A11b.** *Celtis laevigata* var. *reticulata* (netleaf hackberry)- and/or *Philadelphus lewisii* (Lewis' mock orange)-dominated scrub woodland and shrublands; lower montane and foothill regions around the Columbia Basin, Idaho and northwestern Wyoming. Numerous relatively small

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- stands, valley bottoms along riparian margins, on lower slopes of river terraces near seepage lines, and on scree slopes. ....  
 ..... **A3973 *Celtis laevigata* var. *reticulata* / *Philadelphus lewisii* Wet Scrub Alliance**
- A12a.** Shrublands dominated by *Cornus sericea* (red-osier dogwood), *Dasiphora fruticosa* ssp. *floribunda* (shrubby-cinquefoil), *Rosa woodsii* (Woods' rose), *Ribes lacustre* (prickly currant), and/or *Ribes hudsonianum* (northern black currant). Wet valley bottoms and lower slopes that have seasonal subirrigation. ....  
 ..... **A3773 *Cornus sericea* - *Dasiphora fruticosa* ssp. *floribunda* - *Ribes* spp. Wet Shrubland Alliance**
- A12b.** Shrublands dominated by *Alnus incana* (gray alder), *Alnus viridis* ssp. *sinuata* (Sitka alder), and/or *Betula occidentalis* (water birch) ..... **A13**
- A13a.** Dense tall shrublands of *Alnus incana* (gray alder) or *Alnus viridis* ssp. *sinuata* (Sitka alder), sometimes with *Acer circinatum* (vine maple). Adjacent to streams and in mountain meadows at moderate to high-elevation (1200-3000 m) northern Rocky Mountains and Cascade Range where deep snow accumulations are common. ....  
 ..... **A3771 *Alnus incana* - *Alnus viridis* Wet Shrubland Alliance**
- A13b.** Dense, closed canopy shrublands, dominated by *Betula occidentalis* (water birch). Moderately wide stream benches, floodplains, hillside seeps in the mountains and foothills. Rocky Mountains, intermountain ranges of Nevada and Sierra Nevada of California.....  
 ..... **A3772 *Betula occidentalis* Wet Shrubland Alliance**
- A14a.** Short statured (generally <1.5 m (5 ft)) riparian and wetland shrublands at high, upper montane and subalpine elevations, dominated by *Salix commutata* (undergreen willow), *Salix orestera* (Sierra willow), *Salix brachycarpa* (shortfruit willow), *Salix farriae* (Farr's willow), *Salix planifolia* (diamondleaf willow), and/or *Salix wolfii* (Wolf's willow). ..... **A15**
- A14b.** Tall statured (generally >1.5 m, (5 ft) tall) willow dominated shrublands at lower altitudes ..... **A17**
- A15a.** Dense shrubland up to 2 m in height, dominated by *Salix orestera* (Sierra willow). Low-gradient basin floors, streamsides, and wet meadows around 3050-3200 m (10,000-10,500 feet) elevation in the Sierra Nevada of California and in Oregon and Nevada. ....  
 ..... **A2563 *Salix orestera* Wet Shrubland Alliance**
- A15b.** Vegetation not like above in all respects..... **A16**
- A16a.** *Salix commutata* (undergreen willow) dominates; narrow riparian zones along upper reaches of streams and elongated openings in higher elevation forests. Typically between 2065 and 2220 m in British Columbia, Oregon, Washington, Idaho, western Montana and just into northern California; possibly as far east as Wyoming.....  
 ..... **A1003 *Salix commutata* Wet Shrubland Alliance**
- A16b.** Sublpine to alpine shrublands of Intermountain West and Rocky Mountains; dominated by *Betula glandulosa* (resin birch), *Salix brachycarpa* (shortfruit willow), *Salix farriae* (Farr's willow), *Salix planifolia* (diamondleaf willow), and/or *Salix wolfii* (Wolf's willow). Understory typically dense, graminoid-dominated, occasionally forb-dominated, including *Carex aquatilis* (water sedge), *Carex microptera* (smallwing sedge), *Carex scopulorum* (mountain sedge), *Carex utriculata* (Northwest Territory sedge), *Deschampsia caespitosa* (tufted hairgrass), and others. Forb species may include *Caltha leptosepala* (white marsh-marigold), *Fragaria virginiana* (Virginia strawberry), *Pedicularis groenlandica* (elephanthead lousewort), *Swertia perennis* (felwort), and others. ....  
 ..... **A3770 *Salix wolfii* - *Salix brachycarpa* - *Betula glandulosa* Wet Shrubland Alliance**
- A17a.** Wet, tall shrublands dominated by *Salix lasiolepis* (arroyo willow); stream benches, seeps, or as stringer communities along drainages, between 259 and 2490 m. ....  
 ..... **A0977 *Salix lasiolepis* Wet Shrubland Alliance**
- A17b.** Vegetation not like above in all respects..... **A18**
- A18a.** Riparian shrublands dominated by *Salix eastwoodiae* (mountain willow) and/or *Salix lemmonii* (Lemmon's willow). Other species such as *Salix planifolia* (diamondleaf willow), *Salix boothii* (Booth's willow), and *Betula glandulosa* (resin birch) may occur. Glacial valley bottoms (e.g., seeps, toeslopes, benches, and stream benches), wet mountain meadows, and streambanks with gentle slopes (3%) from 2300-3200 m.....  
 ..... **A3774 *Salix eastwoodiae* - *Salix lemmonii* Wet Shrubland Alliance**

**A18b.** Shrublands not dominated by *Salix eastwoodiae* (mountain willow) and/or *Salix lemmonii* (Lemmon's willow).....**A19**

**A19a.** Tall (>1.5 m) riparian and wetland shrublands of single- or mixed-*Salix* (willow) species, including *Salix bebbiana* (Bebb willow), *Salix boothii* (Booth's willow), *Salix drummondiana* (Drummond's willow), *Salix eriocephala* (Missouri River willow), *Salix geyeriana* (Geyer's willow), *Salix ligulifolia* (strapleaf willow), *Salix lucida ssp. caudata* (greenleaf willow), *Salix lucida ssp. lasiandra* (Pacific willow), *Salix lutea* (yellow willow), *Salix planifolia* (diamondleaf willow), and *Salix prolixa* (MacKenzie's willow). Widespread from eastern Oregon and Washington, Idaho, Montana, Wyoming, Colorado, Utah, Nevada, New Mexico, and Arizona..  
.....**A3769 Salix boothii - Salix geyeriana - Salix lutea Montane Wet Shrubland Alliance**

**A19b.** Montane riparian shrublands of tall, dense canopy of *Salix monticola* (park willow) often with other willow species such as *Salix geyeriana* (Geyer's willow), *Salix drummondiana* (Drummond's willow), *Salix lucida ssp. lasiandra* (Pacific willow), *Salix planifolia* (diamondleaf willow), and *Salix wolfii* (Wolf's willow). Rocky Mountains between 2310 and 3350 m along stream reaches in wide to narrow valleys (20-500 m) with broad, swift-moving streams and active, flat (3-8%) floodplains. .... **A0981 Salix monticola Wet Shrubland Alliance**

**A20a.** Stands of native willows and/or native *Artemisia cana* (silver sagebrush) sagebrush with non-native grasses and forbs dominant in the understory, found in western U.S. streams and floodplains. .. **A4217 Salix spp. - Artemisia cana Ruderal Understory Wet Shrubland Alliance**

**A20b.** Vegetation not like above in all respects.....**A21**

#### **G524 Western North American Ruderal Marsh, Wet Meadow & Shrubland**

**A21a.** Tall robust herbaceous marsh vegetation dominated by non-native grasses such as *Phalaris arundinacea* (reed canarygrass), *Phragmites australis ssp. australis* (European common reed), *Arundo donax* (giant reed), and/or *Alopecurus pratensis* (meadow foxtail). .... **A22**

**A21b.** Vegetation not like above in all respects.....**A23**

**A22a.** Dominated by *Phalaris arundinacea* (reed canarygrass), which tends to occur in monocultures; mesic to wet disturbed areas and along rivers that no longer flood throughout the western U.S. .... **A3846 Phalaris arundinacea Western Ruderal Marsh Alliance**

**A22b.** Common reed marsh alliance dominated by introduced *Phragmites australis ssp. australis* (European common reed), *Arundo donax* (giant reed), and/or *Alopecurus pratensis* (meadow foxtail). Temperate regions of the western U.S. and Canada. ....  
. **A3847 Phragmites australis - Arundo donax - Alopecurus pratensis Ruderal Marsh Alliance**

**A23a.** Non-native forb-dominated waste and other disturbed places of the western U.S. dominated by such species as *Conyza canadensis* (Canadian horseweed), *Cirsium arvense* (Canada thistle), or *Lactuca serriola* (prickly lettuce) (other species may be present to dominant). ....  
**A3849 Conyza canadensis - Cirsium arvense - Lactuca serriola Ruderal Wet Meadow Alliance**

**A23b.** Grasslands dominated by introduced grasses very common and widespread in the western U.S. where they have invaded natural meadows, wetlands and riparian areas. ....**A24**

**A24a.** Dominated or codominated by the exotic perennial forage grass *Sorghum halepense* (Johnsongrass), with a variety of associated species (*Amaranthus palmeri* (carelessweed), *Prosopis velutina* (velvet mesquite), *Chenopodium berlandieri* (pitseed goosefoot), *Chloris virgata* (feather fingergrass), *Eragrostis* (lovegrass) spp., *Eriochloa acuminata* (tapertip cupgrass), *Ipomoea* (morning-glory) spp., *Kallstroemia grandiflora* (Arizona poppy), *Leptochloa panicea* (sprangeltop), *Salsola kali* (Russian thistle), and *Solanum elaeagnifolium* (silverleaf nightshade). Northern Mexico, Arizona and elsewhere in the desert southwestern U.S., probably does not occur in the central Great Basin. ....  
..... **A2020 Sorghum halepense Ruderal Desert Grassland Alliance\***

**A24b.** Grasslands dominated by introduced grasses such as *Agrostis gigantea* (redtop), *Agrostis stolonifera* (creeping bentgrass), *Alopecurus pratensis* (meadow foxtail), or *Poa pratensis* (Kentucky bluegrass), Very common and widespread in the western U.S. where it has invaded natural meadows, wetlands and riparian areas. ....  
..... **A3848 Poa pratensis - Agrostis gigantea - Agrostis stolonifera Ruderal Marsh Alliance**

#### **G531 Arid West Interior Freshwater Marsh**

**A25a.** Bulrush or cattail marshes .....**A26**

\* Indicates that NVC unit is peripheral to the NBR key area and may not be present.

- A25b.** Lower stature marshes dominated by other taxa. .... **A27**
- A26a.** Freshwater bulrush marshes, the most abundant species are *Schoenoplectus acutus* (hardstem bulrush), *Schoenoplectus americanus* (chairmaker's bulrush), *Schoenoplectus californicus* (California bulrush), *Schoenoplectus fluviatilis* (river bulrush), *Schoenoplectus maritimus* (cosmopolitan bulrush), *Schoenoplectus pungens* (common threesquare), *Schoenoplectus tabernaemontani* (softstem bulrush), and/or *Scirpus microcarpus* (panicled bulrush). Sites flooded (on average 1 m deep) for most of the growing season. ....  
 .. **A3895 Schoenoplectus americanus - Schoenoplectus acutus - Schoenoplectus californicus Marsh Alliance**
- A26b.** Cattail freshwater marshes dominated by *Typha angustifolia* (narrowleaf cattail), *Typha domingensis* (southern cattail), and/or *Typha latifolia* (broadleaf cattail); can be monotypic or mixed with bulrush species such as *Schoenoplectus acutus* (hardstem bulrush), *Schoenoplectus americanus* (chairmaker's bulrush), or *Schoenoplectus pungens* (common threesquare). Most commonly along lake margins and in shallow basins, and occasionally in river backwaters. ....  
 ..... **A3896 Typha domingensis - Typha latifolia - Typha angustifolia Western Marsh Alliance**
- A27a.** Dense, nearly monotypic stands dominated by *Paspalum distichum* (knotgrass). Mud or sand flats, moist places, marshes and ditches of low valleys of Oregon, Washington, Nevada and California. .... **A3894 Paspalum distichum Marsh Alliance**
- A27b.** Vegetation not like above in all respects.....**A28**
- A28a.** Marshes and low areas dominated or codominated by *Eleocharis palustris* (common spikerush) and/or *Eleocharis macrostachya* (pale spikerush). Shallow, mostly still water throughout much of the western United States and into northern Mexico, from sea level to upper montane altitudes on a variety of landforms. ....  
 ..... **A3891 Eleocharis palustris - Eleocharis macrostachya Marsh Alliance**
- A28b.** Marshes or other wet low-lying areas dominated by emergent *Equisetum fluviatile* (water horsetail), *Equisetum laevigatum* (smooth horsetail), and/or *Equisetum x ferrissii* (Ferriss' horsetail) all of which can form monotypic stands. Water is shallow (<1 m) over mineral soils, usually sand/or silt, along wave-washed shores and stream channels of the western U.S. and Canada..... **A3892 Equisetum fluviatile - Equisetum x ferrissii Marsh Alliance**

## 2.C.5 Salt Marsh

### D036 North American Western Interior Brackish Marsh, Playa & Shrubland

- M1a.** Macrogroup of alkaline and saline wetlands with salt-tolerant plant growth; characteristic species include *Atriplex* (saltbush) spp., *Distichlis spicata* (saltgrass), *Isocoma acradenia* (alkali goldenbush), *Salicornia* (pickleweed) spp., *Sarcobatus vermiculatus* (greasewood), *Sesuvium verrucosum* (verrucose seapurslane), *Sporobolus* (dropseed) spp., *Suaeda moquinii* (Mojave seablite), and *Triglochin maritima* (seaside arrowgrass). Playas, washes, mudflats and depressional wetlands where evaporation far exceeds precipitation and/or where bedrock and soil properties contribute to alkaline/saline conditions; western Great Plains to the west coast; southwestern Canada. ....**G2**  
 ..... **M082 Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland**
- M1b.** There is only one macrogroup in this division

### M082 Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland

- G2a.** Saline scrub wetlands of the western Great Plains, Intermountain West, extending into Central Valley and San Joaquin Valley in California south into Baja California. Characteristic species include *Atriplex* (saltbush) spp., *Allenrolfea occidentalis* (iodinebush), *Pluchea sericea* (arrowweed), *Salicornia rubra* (red swampfire), *Sarcobatus vermiculatus* (greasewood), *Sesuvium verrucosum* (verrucose seapurslane), and/or *Suaeda moquinii* (Mojave seablite).....**A3**  
 ..... **G537 North American Desert Alkaline-Saline Wet Scrub**
- G2b.** Alkaline-saline marshes of non-coastal and non-tidal areas; cover varies from dense to sparsely vegetated playas where soils and water (if present) are alkaline. Characteristic species include *Distichlis spicata* (saltgrass), *Eleocharis palustris* (common spikerush), *Eleocharis rostellata* (beaked spikerush), *Leymus cinereus* (basin wildrye), *Leymus triticoides* (beardless wildrye), *Muhlenbergia* (muhly) spp., *Puccinellia lemmonii* (Lemmon's alkaligrass), *Salicornia* (pickleweed) spp., *Sporobolus airoides* (alkali sacaton), and *Triglochin maritima* (seaside arrowgrass). ....**A9**  
 ..... **G538 North American Desert Alkaline-Saline Marsh & Playa**

**G537 North American Desert Alkaline-Saline Wet Scrub**

- A3a.** Dominated by *Atriplex* species or *Sarcobatus vermiculatus* ..... **A4**
- A3b.** Vegetation not like above ..... **A7**
  
- A4a.** Shrublands dominated by *Sarcobatus vermiculatus* (greasewood). Lowland sites in plains, mountain valleys and intermountain basins in semi-arid western U.S., generally flat, poorly drained, seasonally, temporarily or intermittently flooded sites with a shallow or perched water table; alkali flats around playas and floodplains along stream channels.....  
 ..... **A1046 Sarcobatus vermiculatus Intermountain Wet Shrubland Alliance**
- A4b.** Dominated by *Atriplex* (salt bush) species ..... **A5**
  
- A5a.** Saltbush shrubland of the southwest dominated by *Atriplex spinifera* (spinescale saltbush) in intermittently flooded habitats; soils often carbonate rich. ....  
 ..... **A0865 Atriplex spinifera Wet Shrubland Alliance**
- A5b.** Dominated by other *Atriplex* (saltbush) species ..... **A6**
  
- A6a.** Dominated by *Atriplex parryi*. ..... **A2507 Atriplex parryi Wet Shrubland Alliance**
- A6b.** *Atriplex lentiformis* (big saltbush) is dominant or codominant; on southeast- and southwest-facing slopes..... **A3173 Atriplex lentiformis Wet Shrubland Alliance**
  
- A7a.** Characterized by saline wet species *Suaeda moquinii* (Mojave seablite) and/or *Salicornia rubra* (red swampfire); *Isocoma acradenia* (alkali goldenbush) occasionally dominant. Moist or seasonally dry flats, margins of intermittently flooded playas, and low coastal areas. Generally have low to sparse cover (<10% total vegetation). Primarily warm deserts of southwest North America.....  
 ..... **A3880 Suaeda moquinii - Salicornia rubra Alkaline Wet Scrub Alliance\***
- A7b.** Stands not above in all respects ..... **A8**
  
- A8a.** Flats dominated by *Allenrolfea occidentalis* (iodinebush); saline habitats throughout the arid intermountain western United States, such as alkaline flats along the margins of salt lakes, in depressions among gypsum ridges, and along washes in saline overflow areas.....  
 ..... **A0866 Allenrolfea occidentalis Wet Shrubland Alliance**
- A8b.** Dominated by *Pluchea sericea* (arrowweed) with or without other shrubs .....  
 ..... **A0798 Pluchea sericea Wet Shrubland Alliance**

**G538 North American Desert Alkaline-Saline Marsh & Playa**

- A9a.** Dominated or codominated by *Eleocharis palustris* (common spikerush) or *Eleocharis rostellata* (beaked spikerush). Other salt-tolerant species may also be present: *Carex aquatilis* (water sedge), *Distichlis spicata* (saltgrass), *Glaux maritima* (sea milkwort), *Juncus balticus* (Baltic rush), and *Muhlenbergia asperifolia* (scratchgrass). Adjacent to salt waterbodies or on the margins of high-evaporation playas of central Intermountain West basins. Surface water, if present, is highly saline. ....  
 ..... **A3930 Eleocharis palustris - Eleocharis rostellata Alkaline-Saline Marsh Alliance**
- A9b.** Vegetation not like above in all respects..... **A10**
  
- A10a.** Alkaline/saline wet meadows dominated by graminoids *Leymus cinereus* (basin wildrye), *Leymus triticoides* (beardless wildrye), *Muhlenbergia asperifolia* (scratchgrass), *Puccinellia lemmonii* (Lemmon's alkaligrass), *Puccinellia nuttalliana* (Nuttall's alkaligrass), *Spartina gracilis* (alkali cordgrass), and/or *Sporobolus airoides* (alkali sacaton) and/or *Hordeum jubatum* (foxtail barley) ..... **A11**
- A10b.** Alkaline/saline wet meadows dominated by *Frankenia salina* (alkali seaheath) , *Distichlis spicata* (saltgrass) and/or other salt-tolerant species..... **A14**
  
- A11a.** Alkaline/saline wet meadows or playas dominated by *Leymus cinereus* (basin wildrye), *Leymus triticoides* (beardless wildrye) or *Hordeum jubatum* (foxtail barley) ..... **A12**
- A11b.** Alkaline/saline wet meadows or playas dominated by *Muhlenbergia asperifolia* (scratchgrass), *Puccinellia lemmonii* (Lemmon's alkaligrass), *Puccinellia nuttalliana* (Nuttall's alkaligrass), *Spartina gracilis* (alkali cordgrass), and/or *Sporobolus airoides* (alkali sacaton), ..... **A13**

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- A12a.** *Leymus cinereus* (basin wildrye)- and *Leymus triticoides* (beardless wildrye)-dominated grasslands of alkaline/saline wet meadows; Intermountain West, including the Great Basin and Columbia River Basin, as well as and California's Central Valley and coastal plains. ....  
 ..... **A1329 Leymus cinereus - Leymus triticoides Alkaline Wet Meadow Alliance**
- A12b.** Grasslands dominated by *Hordeum jubatum* (foxtail barley) found in lowlands with moderately to strongly saline or alkaline soils. ....  
 ..... **A3932 Hordeum jubatum Alkaline Wet Meadow Alliance**
- A13a.** Sparse to dense grasslands/meadows dominated by *Muhlenbergia asperifolia* (scratchgrass), *Puccinellia lemmonii* (Lemmon's alkaligrass), *Puccinellia nuttalliana* (Nuttall's alkaligrass), *Spartina gracilis* (alkali cordgrass), and/or *Sporobolus airoides* (alkali sacaton), singly or mixed. Lowland habitats- playas, swales, terraces along intermittently flooded washes, and flats that are alkaline or moderately saline. ....  
 ..... **A1334 Sporobolus airoides - Muhlenbergia asperifolia - Spartina gracilis Alkaline Wet Meadow Alliance**
- A13b.** Vegetation not like above in all respects.....**A14**
- A14a.** Salt marsh and playas dominated by the subshrub *Frankenia salina* (alkali seaheath) often codominant with *Distichlis spicata* (saltgrass) and/or other salt-tolerant species. ....  
 ..... **A4241 Frankenia salina Salt Marsh & Playa Alliance\***
- A14b.** Vegetation not like above in all respects.....**A15**
- A15a.** Non-tidal; dominated by *Distichlis spicata* (saltgrass). Playas and ephemeral streams with sparse to dense herbaceous cover; on deep, saline, alkaline and fine-textured soils. Widespread in semi-arid western U.S. with variable flood regimes. ....  
 ..... **A1332 Distichlis spicata Alkaline Wet Meadow Alliance**
- A15b.** Open scrub canopy dominated by *Sesuvium verrucosum*, generally <25% total vegetation. Alkaline wetlands on moist or seasonally dry flats, margins of intermittently flooded desert playas and coastal plains across the warm deserts of North America. ....  
 ..... **A3879 Sesuvium verrucosum Desert Salt Mudflat Scrub Alliance**

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