United States National Vegetation Classification

USNVC

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United States National Vegetation Classification

Revisions to Great Plains grassland, shrubland, and woodland vegetation types: Proceedings of a USNVC Workshop

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Cover photo: Great Plains grasslands in the Washita River basin as seen from the Four Canyon Preserve, The Nature Conservancy, Ellis County, Oklahoma (photo: Bruce Hoagland, used with permission)

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Michael Lee was faced with the daunting task of developing peer review tools that were both intuitive for ecologists to use and which could help automate changes to the USNVC database. We thank him for his patience and his innovative methods, which allowed us to efficiently update the USNVC.

In completing the final submission of this report, we were fortunate to have Erin Lunsford Jones complete the copy-editing..

TABLE OF CONTENTS

ABSTRACT

The Great Plains of the United States fosters a broad array of natural communities that reflect its unique biophysical setting, climate and natural disturbance regimes. The first comprehensive list of Great Plains vegetation associations for the U.S. National Vegetation Classification (USNVC) was published in 1997, and since that time the hierarchical structure of the U.S. National Vegetation has changed. Vegetation types attributed to the Great Plains were devised from syntheses of existing literature and expert knowledge, due to a dearth of regional scale plot datasets. The need had arisen to reconcile USNVC types within the context of the regional ecological gradients, and to evaluate and update groups, alliances, and associations in the Great Plains. Here, we report the results of an expert-based workshop review of the USNVC groups and alliances attributed to the Great Plains. The revisions adopted are based upon the consensuses of 11 vegetation ecologists with extensive experience in the region. The mixedgrass and shortgrass prairie regions were the primary focus of this review, but also adjacent portions of the tallgrass prairie, Central Midwest and Cross Timber woodlands and the Great Basin sagebrush shrublands that extend into the Great Plains were also reviewed. Eight groups were reviewed during the workshop, and proposed actions included changes to the attributed geography, changes to the name, and reassignment of alliances. Forest and Woodland groups in the Great Plains presented several challenges, specifically units that consist of *Fraxinus pennsylvanica*, *Juniperus virginiana*, *Quercus macrocarpa*, *Quercus stellata*, *Ulmus americana*, and other woody plants with large geographic ranges. The expert-based methodology successfully resolved numerous issues within the Great Plains classification, but all participants agree that increasing the number of plot-based datasets in the region is imperative to resolving issues at all scales of the classification.

INTRODUCTION

As a scientific. The Great Plains grassland, shrubland and woodland vegetation types that were incorporated into the United States National Vegetation Classification (USNVC) are largely based on a synthesis of existing literature and the expert knowledge of vegetation scientists both in Canada and the U.S. A list of plant associations for the Great Plains was published by Schneider et al. (1997), which in turn was integrated into a comprehensive list of USNVC associations and alliances released by Anderson et al. (1998). Users of the classification hierarchy employed at that time identified limitations to how upper level structural-physiognomic criteria were used to organize the lower level vegetation types, which precipitated a comprehensive review and revision of the hierarchy (FGDC 2008). The resulting USNVC hierarchy, adopted as a revised federal standard by FGDC (2008) integrated three new mid-level units (group, macrogroup, and division) above the alliance and association levels. Concurrent with this updated USNVC was a revision of the alliance concept and adoption of a definition that emphasized floristics and ecology. These efforts were followed by the formal publication of the USNVC (USNVC 2.0 on usnvc.org) in 2016. The USNVC 2.0 provides a comprehensive set of types at all levels within the new hierarchy, incorporating the revised alliance concepts under the groups, macrogroups and divisions. However, it was recognized that not all existing alliances and associations fit neatly into the new structure, prompting the need to review and attribute legacy data to the appropriate group category.

With the release of USNVC 2.0, USNVC partners also committed to an ongoing peer review process for any changes. To do so the ESA Panel created a USNVC Review Board to manage the process. The Board provides the process for and management of formal peer review when changes are proposed to the USNVC. The Board may also nominate items for review, such as improvements to the classification in a specific geographic region. Thus, the Board identified the Great Plains as a region in which the assigned vegetation units required a comprehensive review. Ideally, any review undertaken by the Board would include an analysis of region-wide vegetation plot data, but such data are scant in the Great Plains. In fact, there are no published large-scale analyses of mixedgrass and shortgrass prairie vegetation that are comparable to tallgrass prairie such as Diamond and Smeins (1988). The USNVC partners are committed to encouraging more rigorous plot-based analyses, but given the need to review the 2016 USNVC publication for the Great Plains, the partners adopted an expert review process.

The objective of this study is to employ an expert-based workshop approach to revise USNVC alliance and group vegetation concepts for the Great Plains, using the vegetation-ecological criteria of the FGDC standard (2008, Faber-Langendoen et al. 2014). Where needed, associations will also be revised to assure proper correspondence to their respective alliances and groups.

METHODS

METHODOLOGICAL PRINCIPLES FOR THE USNVC

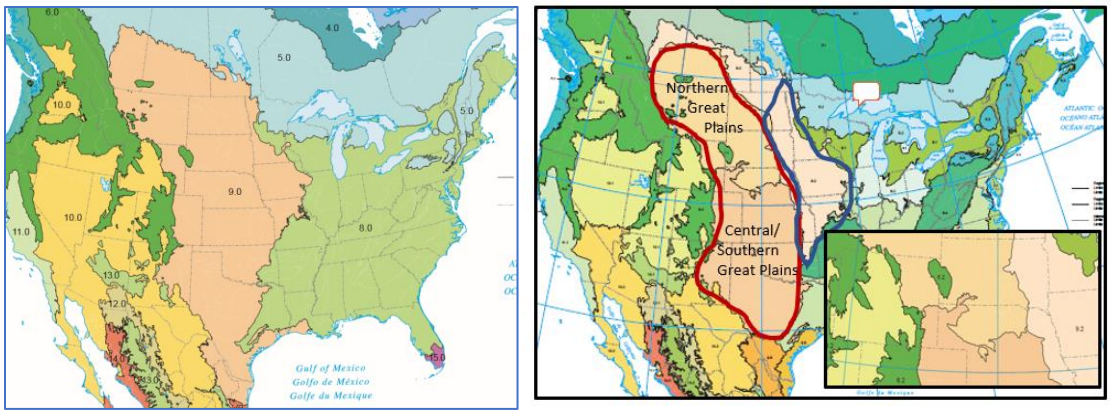
The geographic scope of the revisions reported here was primarily in the mixedgrass and shortgrass prairie regions, corresponding to relevant portions of USEPA (2013) Level II ecoregions 9.3 (West-Central Semi-Arid Prairies; hereafter "Northern Great Plains") and 9.4 (South Central Semi-Arid Prairies; hereafter Central-Southern Great Plains) (Fig. 1). We also reviewed portions of tallgrass prairie types. Together the tallgrass, mixedgrass and shortgrass prairie are part of the North American Central Lowlands Grassland & Shrubland division (USNVC 2.0). We typically use the term "Great Plains" to refer to mixedgrass and shortgrass types in the sense of USEPA (2013) regions 9.3 and 9.4 (Fig. 1). The environmental context is the north-south and east-west climatic gradients in the region, which represents a transition from cool to warm and moist to dry climates, respectively. Nebraska and southeast Wyoming represent frontier where the Northern and Central-Southern vegetation are distinguished (Fig. 1b).

Historic or potential vegetation patterns of the Great Plains were mapped by Kűchler (1964) (Fig. 2) and more recently by NatureServe, using ecological systems types (Comer et al. 2018) (Fig. 3). We show the relation of USNVC macrogroups and groups to these map units in Table 1.

Pertinent observations of the relation of Kűchler types to the USNVC groups (see Table 1) include:

- Kűchler Grama-needlegrass-wheatgrass (type 64): the equivalent group is Northern Great Plains Dry Mixedgrass Prairie (G331).
- Kűchler Grama-buffalo grass (type 65): the equivalent group (Great Plains Shortgrass Prairie G144) is limited to south of the Platte River in Nebraska and Wyoming.
- Kűchler Wheatgrass-bluestem-needlegrass (type 67):
    - In the USNVC, Northern Great Plains Mesic Mixedgrass Prairie (G141) is the equivalent group, but it does not extend south of the Nebraska Sandhills.
    - The parts of Kűchler Wheatgrass-bluestem-needlegrass (type 67) that are in southern Nebraska belong with G133.
- Kűchler Bluestem-grama prairie (type 69): Central Great Plains Mixedgrass Prairie (G133) is the equivalent group, but the Bluestem-grama prairie does not extend as far south. As a result, the Central Great Plains Mixedgrass Prairie encompasses part of Kűchler Mesquite-buffalo grass (type 85).

The USNVC groups, as defined at the outset of our review, are directly equivalent to NatureServe's ecological systems (Table 1). One substantive change initiated in the review, was the combination of the Western Great Plains Sand Prairie (CES303.670) and the Western Great Plains Sandhill Steppe (CES303.671) systems, not mapped, which was then segregated into northern (Nebraska sand hills and north) and southern sand dominated systems.



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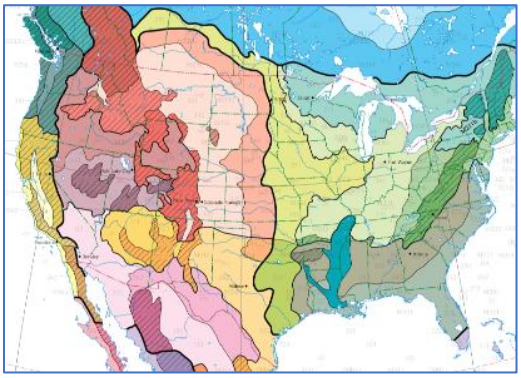

c)

Figure 1. Ecoregions of North America, showing regionalization of Great Plains landscapes. Great Plains region based on the work of J. Omernik and others, as published by USEPA (2013). Showing a) Level I (9.0 – Great Plains) and b) Level 2, showing division into an eastern tallgrass prairie region (blue outline), a northern Great Plains region and a central-southern region, including the Edward's Plateau. c) The ecoregion map of North America by Bailey (1997) separates mixedgrass and shortgrass prairie (steppe) (ecodivision 330 in two shades of coral) from the tallgrass prairie and aspen parkland (ecodivision 250, in lime green) to the east and north, and from the Southwest Plateau and Plains Dry Steppe and Shrub division (ecodivision 315 in yellow) to the south.

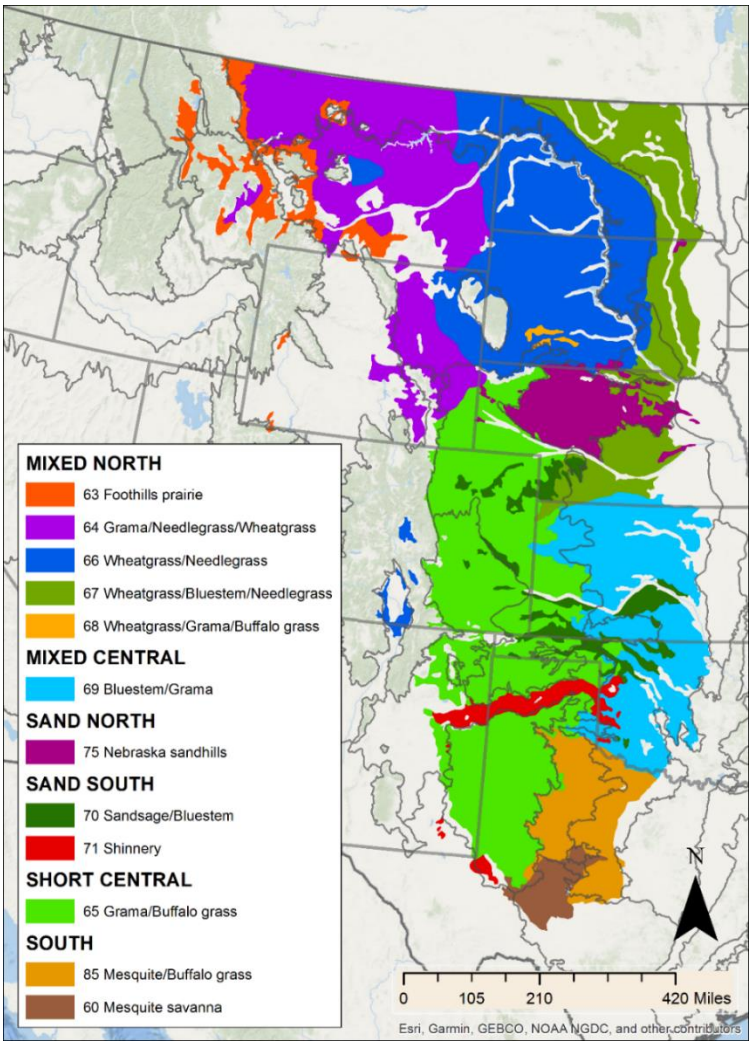

Figure 2. The distribution of Kűchler (1964) grassland and shrubland types for the Great Plains.

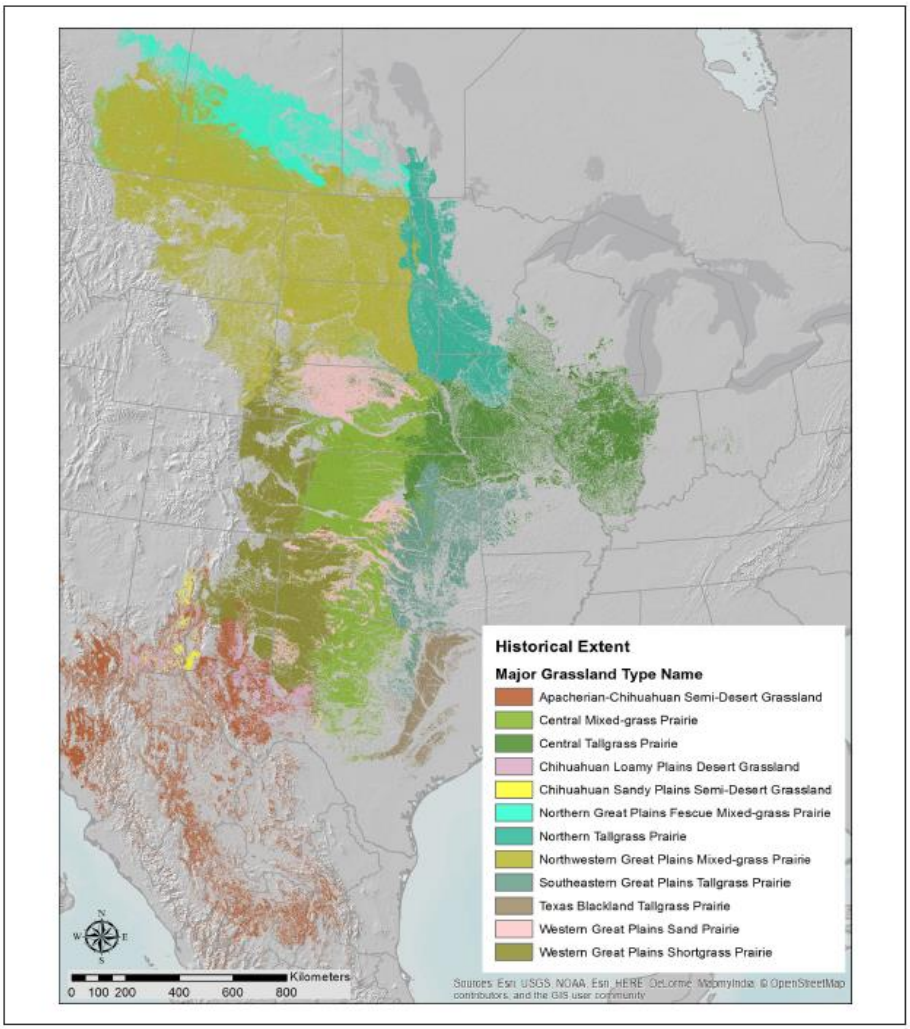

Figure 1. Approximate historical extent of 12 major temperate grassland types.

Figure 3. NatureServe's 12 ecological system types in the Great Plains and warm desert region (Comer et al. 2018). See Table 1 for corresponding USNVC Group types.

Table 1. Correspondence of USNVC groups (prior to our revisions) with the vegetation map of Kŭchler (K) (1964) and the map of ecological systems (S) (Comer et al. 2018).

USNVC Types		**Kŭchler (K) and Ecological System (S) type**		
2.B.2 Temperate Grassland & Shrubland		Type	Code	Name
2.B.2.Nb Central North American Grassland & Shrubland				
M054. Central Lowlands Tallgrass Prairie				
G335	Blackland & Coastal Tallgrass Prairie	K	77	Bluestem-sacahuista prairie

		S	CES203.550	Texas-Louisiana Coastal Prairie
		K	76	Blackland prairie
		S	CES205.684	Texas Blackland Tallgrass Prairie
G334	Southern Tallgrass Prairie	K	74	Bluestem prairie [in part]
		S	CES205.685	Southeastern Great Plains Tallgrass Prairie
G333	Central Tallgrass Prairie	K	74	Bluestem prairie [in part]
		S	CES205.683	Central Tallgrass Prairie
G075	Northern Tallgrass Prairie	K	74	Bluestem prairie [in part]
		S	CES205.686	Northern Tallgrass Prairie
M051. Great Plains Mixedgrass & Fescue Prairie				
G133	Central Great Plains Mixedgrass Prairie	K	69	Bluestem-grama prairie
		S	CES303.659	Central Mixedgrass Prairie
G331	Northern Great Plains Dry Mixedgrass Prairie	K	64	Grama-needlegrass-wheatgrass
		S	CES303.674	Northwestern Great Plains Mixedgrass Prairie
G141	Northern Great Plains Mesic Mixedgrass Prairie	K	66	Wheatgrass-needlegrass
			67	Wheatgrass-bluestem-needlegrass
		S	CES303.674	Northwestern Great Plains Mixedgrass Prairie
G332	Northern Great Plains Rough Fescue Prairie	K	--	[not mapped, Canada only]
		S	CES303.451	Northern Great Plains Fescue-Mixed Grass Prairie
M053 Western Great Plains Shortgrass Prairie				
G144. Great Plains Shortgrass Prairie		K	65	Grama-buffalo grass
		S	CES303.672	Western Great Plains Shortgrass Prairie
M052. Great Plains Sand Grassland & Shrubland				
G069	Great Plains Sand Shrubland	K	70	Sandsage-bluestem prairie
		K	71	Shinnery
		S	CES303.671	Western Great Plains Sandhill Steppe
G068	Great Plains Sand Grassland	K	75	Nebraska Sandhills prairie
		S	CES303.670	Western Great Plains Sand Prairie

USNVC Peer Review Board and Participants

The USNVC partners are committed to a peer review process and maintenance of the USNVC, as detailed in FGDC (2008). For that reason, the USNVC Review Board identified a set of peer reviewers to facilitate the Great Plains updates. Sixteen ecologists with expert knowledge of the region were provided with review materials prior to a workshop convened at the Noble Research Institute in Ardmore, Oklahoma on 25-26 February 2019. Eleven ecologists, including USNVC Board members, attended, representing expertise predominantly from the central and southern Great Plains (Table 2). Some participants had published state level vegetation classifications, including Hoagland (2000), Kindscher (Lauver et al. 1999), Steinauer (Rolfsmeier and Steinauer 2010), and almost all had contributed to cross-walking vegetation units that led to the publication of Schneider et al. (1997). Although the focus of the review was on Great Plains mixedgrass and shortgrass grassland and shrubland macrogroups (M051, M052 and M053, Table 1), problematic units related to Tallgrass Prairie (M054) were also addressed. It was also necessary to consider some woodlands in the Central Midwest and Cross Timbers regions and the Great Basin sagebrush shrublands that extend into the Great Plains.

Prior to the workshop, reports were generated from the USNVC version 2.01 database for the Great Plains (published by USGS on usnvc.org, but these data are housed in NatureServe Biotics). The lead editors (BH and DFL) initially reviewed the types and drafted proposed revisions, which were sent to workshop invitees in spreadsheet form, with the hierarchy of types listed in the spreadsheet, and columns added for tracking changes and comments. The spreadsheet was accompanied by a Word document containing the full descriptions of all groups, alliances and associations for each state covered by the revisions to the Great Plains types.

The workshop employed an expert-based approach to facilitate refinement and resolution of geographic, ecological, and floristic issues among various vegetation types. Experts were tasked with developing biogeographically and ecologically coherent concepts for groups, alliances and associations in the absence of full floristic and ecological data. The assumption underpinning this approach is that the resulting edits and vegetation types will be more consistent with the EcoVeg approach of the USNVC. To achieve this goal and thereby improve concepts at alliance and group levels, wide-ranging associations were split as needed, and problematic, vaguely defined associations were merged. A future goal is to test these decisions using regionally comprehensive plot-based datasets as they become available.

All workshop comments were compiled in spreadsheets. These spreadsheets were then sent to identified reviewers that were unable to attend the workshop, and their comments were added to the spreadsheet.

After the review was completed, the lead USNVC Editors (BH, DFL), sent the proposed updates to the USNVC Data Management Team, led by Michael Lee. The team entered all proposed changes into NatureServe Biotics, and sent draft revised versions to the editors, who reviewed the results and provided any additional revisions. Final revised types were then summarized in tables.

Table 2. List of reviewers, either as participants at the USNVC Review Board workshop (WP) on Feb 25-26, 2019 or as Post-workshop Reviewers (PR).

Ecologist	Position	Organization	Email	Review
Karin Decker	Vegetation Ecologist	Colorado Natural Heritage Program	karin.decker@colostate.edu	PR
David D. Diamond	Director	Missouri Resource Assessment Program	diamondd@missouri.edu	WP
Lee Elliott	Vegetation Ecologist	Missouri Resource Assessment Program	elliottle@missouri.edu	WP
Don Faber-Langendoen	Senior Ecologist, USNVC Editor-in-Chief	NatureServe	Don_Faber-Langendoen@natureserve.org	WP
Todd Fagin	Conservation Analyst	Oklahoma Natural Heritage Inventory	tfagin@ou.edu	WP
Scott Franklin	Professor	University of Northern Colorado	Scott.Franklin@unco.edu	WP
Bruce Hoagland	Ecologist / USNVC Regional Editor	Oklahoma Natural Heritage Inventory	bhoagland@ou.edu	WP
George Jones	Vegetation Ecologist	Wyoming Natural Diversity Database	gpjones@uwyo.edu	PR
Kelly Kindscher	Senior Scientist/Professor	Kansas Natural Heritage Inventory	kindscher@ku.edu	WP
Este Muldavin	Coordinator/Ecologist, USNVC Regional Editor	New Mexico Natural Heritage Program	muldavin@unm.edu	WP
Mike Proctor	Senior Research Associate	Noble Research Institute	mdproctor@noble.org	WP
Keith Schulz	Vegetation Ecologist	Private	keithschulz79@gmail.com	PR
Jason Singhurst	Botanist/Plant Ecologist	Texas Parks and Wildlife Department Wildlife Diversity Branch	jason.singhurst@tpwd.texas.gov	WP
Gerry Steinauer	Ecologist	Nebraska Natural Heritage Program	gerry.steinauer@nebraska.gov	WP
Amie Treuer-Kuehn	Botanist/Plant Ecologist	Texas Parks and Wildlife Department Wildlife Diversity Branch	amie.treuer-kuehn@tpwd.texas.gov	PR

BACKGROUND AND METHODOLOGY

The Great Plains workshop was necessitated by legacy issues dating from the creation of the USNVC, which began in 1994. At that time, state ecologists employed state specific vegetation classifications, which often did not consider the full biogeographical extent of a type (alliance, association, etc.), but relied heavily on characteristics of the dominant taxa. These vegetation types were derived from the literature, consultation with state experts, and analysis of available (often local) datasets. When the effort began in 1994 to concatenate state and local classifications into the USNVC, state ecologists attended cross-walking workshops and often appended associations from adjoining states to their state classification based upon two or three shared dominant taxa. Data are lacking in the Great Plains, however, for a quantitative analysis of full floristic data and ecological factors that support the range-wide attribution, leaving association and alliance concepts incomplete with respect to current USNVC criteria for those levels as shown in Table 3 (FGDC 2008, Faber-Langendoen et al. 2014).

Relying solely on the distribution of dominant species, however, often blurs or exaggerates the geographic extent of an alliance or association. For example, the vegetation unit *Schizachyrium scoparium - Sorghastrum nutans* Central Sand & Gravel Grassland Alliance (A4047), if described by the dominants *Schizachyrium scoparium* and *Sorghastrum nutans* alone, could extend across the bioclimatic gradients of the Great Plains and very likely beyond. Therefore, in the absence of extensive and detailed vegetation plot data, a series of ecological and vegetation criteria were employed to guide description of the concept. First, the alliance's geographic scope is constrained by its placement in the Central Tallgrass Prairie group (G333). Second, the alliance concept is guided by a dry habitat character. With these guides, associations are then defined based on more specific kinds of dry habitat characteristics (e.g., sand and gravel) and diagnostic species. Thus, the *Schizachyrium scoparium - Bouteloua curtipendula - Muhlenbergia cuspidata - Symphyotrichum sericeum* Alkaline Grassland / North-Central Dry Limestone - Dolomite Prairie (CEGL002403) association is defined by the diagnostic species found in dry alkaline habitats in the central tallgrass prairie region.

As noted earlier, the physical environment of the Great Plains is characterized by distinct, regional climatic gradients—decreasing annual temperature from south to north, and decreasing annual precipitation from east to west. The workshop participants strove for concordance between the regional climatic gradients and the distribution of vegetation units within the existing Great Plains classification. The groups within four macrogroups (Central Lowlands Tallgrass Prairie (M054), Great Plains Mixedgrass & Fescue Prairie (M051), Western Great Plains Shortgrass Prairie (M053), and Great Plains Sand Grassland & Shrubland (M052)) were the focus of this approach. While the geographic and ecological factors used to define the groups within those macrogroups largely conform to the regional geography (Fig. 1), the state-level distributions do not. Therefore, many of the changes introduced were revisions to the geography of the groups, with follow-on assurance that alliances and associations conform to the new geographies.

Table 3. The USNVC hierarchy levels that are the primary focus of the Great Plains review (from FGDC 2008).

Group	A vegetation unit that is defined by a relatively small 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.
Alliance	A vegetation classification unit containing one or more associations, and 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.
Association	A vegetation classification unit 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.

RESULTS AND DISSCUSSION

I. GROUP LEVEL REVISIONS OF GRASSLANDS AND SHRUBLANDS

Region-wide Patterns of Grasslands and Shrublands

Resolution of group level issues required workshop participants to compare ecological and floristic information for both the Northern and Southern Great Plains classification units and execute appropriate edits. Workshop proposals for changes to Great Plains groups were made in the context of regional ecological gradients, from tallgrass to shortgrass prairie east to west and south to Comanchian grasslands (Table 4). Ruderal grasslands (those typically found as successional types on abandoned agricultural lands, or strongly dominated by invasives) were also reviewed (see Faber-Langendoen et al. 2014 for guidelines on ruderal types). The mixedgrass prairie groups and their component alliances and associations were reviewed in the context of climatic gradients to determine whether a defensible North-South distinction was identifiable. It emerged that an important transition exists for the groups in southwest Nebraska and southeast Wyoming. Therefore, the existing demarcation of the Central Great Plains Mixedgrass Prairie (G133) from the Northern Great Plains Dry Mixedgrass Prairie (G331) and Northern Great Plains Mesic Mixedgrass Prairie (G141) was defined as north of sandhills and the aforementioned area of Nebraska and Wyoming. The distinction between northern and central-southern mixedgrass prairie types is strongly concordant with Kűchler's (1964) types (types 64, 66, and 67 in the north and types 65 and 69 in the central and south (Table 1). They also correspond with the ecoregional distinctions of Omernik (USEPA 2013) between ecoregions 42 (Northwestern Glaciated Plains) and 43 (Northwestern Great Plains) in the north, and ecoregions 25 (High Plains), 26 (Southwestern Tablelands) and 27 (Central Great Plains) to the south.

Table 4. Macrogroups and Groups in the Central North American Grassland & Shrubland Division.

2.B.2. Temperate Grassland & Shrubland	
D023.	**Central North American Grassland & Shrubland**
M054.	**Central Lowlands Tallgrass Prairie**
G335.	**Blackland & Coastal Tallgrass Prairie**
G334.	**Southern Tallgrass Prairie**
G333.	**Central Tallgrass Prairie**
G075.	**Northern Tallgrass Prairie**
M051.	**Great Plains Mixedgrass & Fescue Prairie**
G133.	**Central Great Plains Mixedgrass Prairie**
G331.	**Northern Great Plains Dry Mixedgrass Prairie**
G141.	**Northern Great Plains Mesic Mixedgrass Prairie**
G332.	**Northern Great Plains Rough Fescue Prairie**
M053.	**Western Great Plains Shortgrass Prairie**
G144.	**Great Plains Shortgrass Prairie**
M052.	**Great Plains Sand Grassland & Shrubland**
G888.	**Southern Great Plains Sand Grassland & Shrubland**
G889.	**Northern Great Plains Sand Grassland & Shrubland**
M158.	**Great Plains Comanchian Scrub & Open Vegetation**
G598.	**Comanchian Barrens & Glade**
G191.	**Comanchian Oak - Juniper Scrub**
G192.	**Comanchian Mesquite - Mixed Scrub**
M498.	**Great Plains Ruderal Grassland & Shrubland**
G680.	**Great Plains Comanchian Ruderal Grassland & Shrubland**
G679.	**Northern & Central Great Plains Ruderal Grassland & Shrubland**

Northern Mixedgrass Prairie Groups (G331 and G141)

The southern geographic distributions of the Northern Great Plains Dry Mixedgrass Prairie (G331) and Northern Great Plains Mesic Mixedgrass Prairie (G141) groups were revised and are now considered

to extend no further south than the Nebraska Sandhills and Pine Ridge in northwest Nebraska. A coincident boundary exists in southeast Wyoming along the Platte River.

Review of the east-west gradient in the northern mixedgrass prairie led to the retention of the separation of Northern Great Plains Dry Mixedgrass Prairie (G331) from Northern Great Plains Mesic Mixedgrass Prairie (G141). Recognition of dry mixedgrass prairie provides an important transition type between semi-desert to the west, shortgrass to the south (G144), and the Northern Great Plains Mesic Mixedgrass to the east (see Table 1 and Figure 2 for corresponding locations of equivalent Kűchler types). The two mixedgrass types are segregated based on distinct topo-edaphic settings relative to the regional precipitation gradient. The dry mixedgrass group is found in Wyoming, Montana, Alberta, and the western Dakotas. Colorado, Kansas, New Mexico, Oklahoma, and Texas, however, were deleted from inclusion in this group and the Northern Great Plains Mesic Mixedgrass Prairie.

Central Mixedgrass Prairie Group (G133)

The distribution of the Central Great Plains Mixedgrass Prairie (G133) was defined as occurring south of the Nebraska Sandhills and extended to central Texas, which largely corresponds to Omernik ecoregions 26 (Southwestern Tablelands) and 27 (Central Great Plains). This distribution is similar to Kűchler's Bluestem-grama prairie type (69) but extends further south into the Mesquite-buffalo grass type (85).

Shortgrass Prairie Group (G144)

The northern extent of the Great Plains Shortgrass Prairie (G144) was redefined to extend as far north as Southeast Wyoming and far southwest Nebraska with extensions to the vicinity of Pine Ridge, Nebraska. The geographic extent of Great Plains Shortgrass Prairie is complicated by land use, because, along the "border" with the Central Great Plains Mixedgrass Prairie (G133) and northward in the Northern Great Plains Dry Mixedgrass Prairie (G331), intense grazing can result in the conversion of mixedgrass prairie to a shortgrass prairie aspect. Similar shifts in vegetation have been noted during severe droughts. Reduction in grazing pressure at a site often leads in a reversion to typical mixedgrass prairie vegetation.

Great Plains Sand Grassland & Shrublands (G068, G069) —> (G888, G889)

A substantial change in the classification was the redefinition of the Great Plains Sand Shrubland (G069) and Great Plains Sand Grassland (G068) groups within the Great Plains Sand Grassland & Shrubland (M052). The two groups were defined largely on structural criteria and both ranged widely from Texas to the Canadian prairies. But this geographic range ignored large-scale floristic changes. There is, however, a strong south versus north distinction of species composition in the groups, which is probably best exemplified by turnover in dominants from *Calamovilfa gigantea* in the south to *C. longifolia* in the north. In addition, both sandsage (*Artemisia filifolia*) and shinnery (*Quercus havardii*), the primary dominants of the sand prairie steppe or shrubland, are only found in the central-southern Great Plains. Further, sand prairies in the south are rather limited and are typically a component of sand shrublands. Thus, we defined two new groups based on combination of geographic (climatic), floristic and structural criteria: Northern Great Plains Sand Grassland & Shrubland (G889), and Southern Great Plains Sand

Grassland & Shrubland (G888). The Nebraska Sandhills is largely placed in the northern group, following Locklear (2019), who describes the distribution of sandsage prairie as limited to the southwest part of the sandhills.

An unresolved issue is the assignment of stands dominated by *Yucca glauca.* In northern sand grasslands, there exists a *Yucca glauca - Calamovilfa longifolia* Sand Prairie Scrub Alliance (A1540), with three associations. In the Nebraska sandhills, there are stands in which *Artemisia filifolia* is the dominant and others in which *Yucca glauca* is the dominant, but the two share the same associated flora. In fact, this is the case for sand grassland and shrublands throughout the range of *Artemisia filifolia*. The question thus arose whether a *Yucca glauca* association(s) should be recognized within the *Artemisia filifolia* alliance. This could provide a repository for the extensive sand grasslands dominated by *Yucca glauca* in the southern Great Plains. However, these stands may be result of heavy grazing by cattle.

Central Lowland Tallgrass Prairie groups (G335, G334, G333, G075)

Because of the past dominance-based approach to many alliances in the USNVC, stands of tallgrass prairie species in the western parts of the mixedgrass and shortgrass prairie regions, often found in localized swales and riverine settings, were classified as part of the various tallgrass prairie groups. But these stands lack virtually all of the diagnostic forbs of the tallgrass prairie region. Thus, as detailed in the alliance section, we typically created mixedgrass - big bluestem (*Andropogon gerardii*) alliances for those western associations.

II. GROUP LEVEL REVISIONS OF WOODLANDS AND SAGEBRUSH

The east and west borders of the Great Plains are flanked by forest and woodland vegetation that is characterized by eastern deciduous forest and western montane woody plant taxa. Many of the predominate species in the bordering macrogroups include alliances with species whose ranges extend into the Great Plains. For example, the distribution of *Quercus macrocarpa* extends from the eastern United States to the 100th meridian and beyond. The same is true of other dominant oak species, such *Q. marilandica* and *Q. stellata*. In the NVC, some of forests and woodlands that reside in the Great Plains are attributed to macrogroups that represent vegetation in the adjoining regions. This issue has been persistent for the Quercus macrocarpa woodlands bordering the central and northern Great Plains and the *Quercus stellata* and *Q. marilandica* forest and woodlands on the southern boundary. The situation is comparable for western shrubland species such as *Artemisia bigelovii*, A. tridentata and *Krascheninnikovia lanata.*

Great Plains and Midwest Oak Woodland groups (G181, G649, G329)

Many Great Plains woodlands contain tree species that are outliers of the Eastern Region or the Rocky Mountain region. However, many shrub and herb species have a more distinctively Great Plains distribution, and the climate and ecology of these woodlands is rather distinct from those regions. For that reason, we reassessed how Great Plains woodlands were currently placed in the hierarchy (Table 5).

Table 5. Macrogroups and Groups of the North American Great Plains Forest & Woodland Division (D326) in the context of closely related Eastern North American and Rocky Mountain Division Great Plains Woodlands (unrelated macrogroups and groups in those Divisions are not shown).

1.B.2.	Cool Temperate Forest & Woodland
D008.	**Eastern North American Forest & Woodland**
M012.	**Central Midwest Oak Forest, Woodland & Savanna**
G181.	**Central Midwest Oak Openings & Barrens**
G649.	**North-Central Oak - Hickory Forest & Woodland**
M882.	**Central Midwest Mesic Forest**
G021.	**North-Central Beech - Maple - Basswood Forest**
M016.	**Southern & South-Central Oak – Pine Forest & Woodland**
G017	**Cross Timbers Forest & Woodland**
G013	**Western Gulf Coastal Plain Pine – Oak Forest & Woodland**
D194.	**Rocky Mountain Forest & Woodland**
M501.	**Central Rocky Mountain Dry Lower Montane-Foothill Forest**
G209.	**Rocky Mountain Foothill-Rock Outcrop Limber Pine - Juniper Woodland**
M020.	**Rocky Mountain Subalpine-High Montane Forest**
G222.	**Rocky Mountain Subalpine-Montane Aspen Forest & Woodland**
D326.	**North American Great Plains Forest & Woodland**
M151.	**Great Plains Forest & Woodland**
G329.	**Great Plains Bur Oak Forest & Woodland**
G145.	**Great Plains Mesic Forest & Woodland**
G146.	**Northeastern Great Plains Aspen Woodland**
G328.	**Northwestern Great Plains Aspen Woodland**
G890.	**Southeastern Great Plains Woodland**
M524.	**Great Plains Ruderal Woodland**
G892.	**Great Plains Exotic Ruderal Woodland**

Currently, all Great Plains woodlands are placed in the North American Great Plains Forest & Woodland division (D326), which has one macrogroup and 4 groups:

- Great Plains Forest & Woodland (M151)

- Great Plains Bur Oak Forest & Woodland (G329)
- Great Plains Mesic Forest & Woodland (G145)
- Northeastern Great Plains Aspen-Oak Woodland (G146)
- Northwestern Great Plains Aspen Woodland (G328)

The crux of the problem is interpreting the biogeography of species listed as either dominants or associates in the alliances and associations (see the discussion in Classification Comments of D326 1.B.2.Ne North American Great Plains Forest & Woodland, including suggested revisions by C. Lea; https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.954614/Quercus_macrocarpa_-_Populus_tremuloides_-_Pascopyrum_smithii_Woodland_Division). Many Great Plains woodlands consist of species with distributions centered either to the east or west of the Great Plains. For example, *Fraxinus pennsylvanica, Juniperus horizontalis, Populus tremuloides, Prunus virginiana, Quercus macrocarpa, Ulmus americana*, and others, are not unique to the Great Plains and stands of this vegetation are often small and lack clear diagnostic species.

One option is to take all woodland alliances and associations dominated by *Pinus* spp. and *Juniperus* spp. in Colorado, Montana, Oklahoma, and Wyoming, as well as *Quercus macrocarpa* woodlands in the Black Hills, and place them all in the Central Rocky Mountain Dry Lower Montane-Foothill Forest (M501) of the Rocky Mountain Forest & Woodland division (D194). Likewise, deciduous woodlands in the eastern and central Dakotas, Kansas, Nebraska, and Oklahoma could be placed in the Central Midwest Oak Forest, Woodland & Savanna (M012) of the Eastern North American Forest & Woodland division (D008). However, the Northeastern Great Plains Aspen Woodland Group (G146) and the Northwestern Great Plains Aspen Woodland Group (G328) are difficult to place in either of those two divisions and macrogroups. As a side note, consideration could be given to merging the Northeastern Great Plains Aspen Woodland (G146) and the Northwestern Great Plains Aspen Woodland (G328) into a Northern Great Plains Aspen-Oak Woodland group. No revisions were made at this time.

Revisions were made to the North-Central Oak - Hickory Forest & Woodland group (G649), a member of the Central Midwest Oak Forest, Woodland & Savanna (M012), to ensure that its distribution did not overlap with that of the Great Plains Forest & Woodland (M151), and to refine the concepts and definitions of units to reflect dry and dry-mesic gradients, as well as forest versus woodland distinctions, where needed.

Cross Timbers Forest and Woodlands (G017/G887)

Here we present proposals that will aid in resolving geographical attribution of the *Quercus stellata* and *Q. marilandica* forest and woodlands referred to regional as the Cross Timbers (Fig. 4). These forest and woodlands extend from southeastern Kansas, through Oklahoma and into central Texas along a northeast to southwest axis. The vegetation is a mosaic of forest, woodland, and grassland. The understory of woodland sites in the cross timbers is composed of tallgrass or mixedgrass prairie taxa depending upon

geographic locale, which may be why ecologists such as F.E. Clements considered the cross timbers to be a disclimax in the grassland biome.

Figure 4. *Quercus stellata* - *Quercus marilandica* Forest & Woodland Alliance (A3216) within the **Cross Timbers Woodland Group (G887; formerly G017)** at the Western Wall Wildlife Management Area, Osage County, Oklahoma.

Currently, the cross timbers and associated vegetation alliances are placed in the Southern & South-Central Oak - Pine Forest & Woodland macrogroup (M016) and the Cross Timbers & East-Central Texas Plains Oak Forest & Woodland group (G017). We submit the following three changes. First, move the Cross Timbers & East-Central Texas Plains Oak Forest & Woodland group to the Great Plains Forest & Woodland macrogroup M151. Thus, the cross timbers become the forest and woodland group in the southern Great Plains that is contiguous with the forest and woodland of the Gulf Coastal Plain and Ouachita and Ozark Mountains. It also creates a boundary congruent with the USEPA level 1 ecoregion Great Plains (ecoregion 9) and level 2 South Central Semi-Arid Prairies (ecoregion 9.4). More specifically, the Ecoregion 29 Cross Timbers (Figure 5).

The second proposal is the disposition of four alliances within the group. We propose moving *Quercus stellata* - *Quercus virginiana* / *Ilex vomitoria* Forest & Woodland Alliance (A0668) to the Western Gulf Coastal Plain Pine - Oak Forest & Woodland group (G013). We base this proposal on the distribution of *I. vomitoria*, which has affinities to the Gulf Coastal Plain, not Great Plains. The third proposal is to rename Cross Timbers & East-Central Texas Plains Oak Forest & Woodland group to Cross Timbers forest and woodland group. Moving A0668 is a big enough concept shift to warrant a new code and name for G017, which is now G887.

Finally, we propose changes to the common names of the remaining alliances to reflect subregions within the cross timbers. The *Quercus stellata* - *Quercus marilandica* / *Rhus trilobata* Woodland Alliance (A3218), Western Post Oak - Blackjack Oak Woodland, should be renamed as the Western Cross Timbers Post Oak Forest & Woodland Alliance. The geography corresponds to USEPA ecoregions Western Cross Timbers (29c) and Northwestern Cross Timbers (29h) and the Western Cross Timbers of Dyskterhuis (1948).

The *Quercus stellata* - *Ulmus crassifolia* Forest & Woodland Alliance (A3217), currently the Southern Crosstimbers & Texas Post Oak Forest & Woodland, should be renamed as the Southern Cross Timbers Forest and Woodland. This would also include the Arbuckle Mountains and those cross timbers sites on limestone derived soils along and south the Red River. Adopting this recommendation would place the Southern Cross timbers in the USEPA ecoregions Eastern Cross Timbers (29b), Limestone Cut Plain (29e), Arbuckle Mountains (29i), and Arbuckle Uplift (29g). The *Quercus stellata* - *Quercus marilandica* Forest & Woodland Alliance would be renamed the Northern Crosstimbers Oak Forest & Woodland (A3216), the extent of which falls within the USEPA ecoregion Northern Cross Timbers (29a).

Sagebrush Section

Great Plains grasslands share similarities with shrublands of the western United States (Table 6). On the western flank of the Great Plains, issued were identified related to the geography of two shrubland types: *Artemisia bigelovii* Steppe & Shrubland Alliance (A3223) in the Intermountain Low & Black Sagebrush Steppe & Shrubland group (G308), and the *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance (A3202), which is assigned to the Intermountain Semi-Desert Steppe & Shrubland (G310). Of the three associations in the *Artemisia bigelovii* Steppe & Shrubland Alliance, specific questions arose about the geography of the *Artemisia bigelovii / Bouteloua gracilis* Dwarf-shrub Grassland (CEGL001742), currently attributed to Arizona, Colorado, and New Mexico, and whether it extended onto the Great Plains. According to ecologists from Texas, reported that this association “the northwest Panhandle of Texas, bordering NE New Mexico. It occurs along the western Canadian River Breaks on steep slopes and upper rim of the breaks.” Still to be resolved, however, is whether this association represents a unique dwarf-shrub grassland type on the Great Plains or is it an outlier of the intermountain group.

Table 6. Sagebrush types to the west of Great Plains grasslands. Only sagebrush groups addressed in this review are shown.

3.B.1.	**Cool Semi-Desert Scrub & Grassland**
D040.	**Western North American Cool Semi-Desert Scrub & Grassland**
M171.	**Great Basin-Intermountain Dry Shrubland & Grassland**
G310.	**Intermountain Semi-Desert Steppe & Shrubland**
G775.	**Intermountain Sparsely Vegetated Dune Scrub & Grassland**
M169.	**Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland**
G303.	**Intermountain Dry Tall Sagebrush Steppe & Shrubland**
G302.	**Intermountain Mesic Tall Sagebrush Steppe & Shrubland**
M093.	**Great Basin Saltbush Scrub**
G301.	**Intermountain Dwarf Saltbush - Sagebrush Scrub**

The *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance consist of eight associations. Clarification was required for the geographic distribution of the the *Krascheninnikovia lanata* / *Bouteloua gracilis* Dwarf-shrub Grassland (CEGL001321) and the *Krascheninnikovia lanata* / *Hesperostipa comata* Dwarf-shrubland (CEGL001327). In both cases, it was decided to split the association, tentatively designated and CEGL001321a and CEGL001321b, and CEGL001327a and CEGL001327b, respectively. CEGL001321a and CEGL001327a will remain in the *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance of the Intermountain Semi-Desert Steppe & Shrubland group (G310). The two new associations *Krascheninnikovia lanata* (CEGL001321b and CEGL001327b) were assigned to the Great Plains Shortgrass Prairie group (G144).

III. Alliance and Association Revisions – General Considerations

The group level revisions presented above required review of alliances and associations within affected groups to assure that, for example, central grassland alliances did not extend north of southwest Nebraska and the sandhills, and southeast Wyoming. Similarly, the northern limits of associations and alliances in Great Plains Shortgrass Prairie versus Northern Great Plains Dry Mixedgrass Prairie were carefully reviewed. Thus South Dakota was excluded from the range of shortgrass prairie associations, based on the observation that shortgrass prairie does not extend beyond the far southwest corner of Nebraska that borders Kansas. Here we summarize a few key alliance decisions.

Northern mixedgrass dry shrublands

The species composition of shrubland associations in the Northern Great Plains Dry Mixedgrass Prairie Group (G331) exhibits similarities to Great Basin sagebrush vegetation types. In past iterations of the USNVC, Great Plains associations were assigned to Great Basin sagebrush alliances based on the presence and/or dominance of *Artemisia tridentata*, *Krascheninnikovia lanata*, and other common Great Basin shrubs, irrespective of the mixedgrass prairie associates. As a result, some Great Basin associations extended into western North Dakota, South Dakota and Alberta. Here we create a Northern Great Plains Dry Mixedgrass Shrubland alliance (A4381) that accommodates these dry Great Plains shrubland types.

Southern dry shrublands and shortgrass prairie

We revised the *Krascheninnikovia lanata*/*Bouteloua gracilis* Dwarf-shrub Grassland association (CEGL001321) by splitting it into two associations, one representing vegetation in the Great Basin on the Colorado Plateau, the other in the western Great Plains. The easternmost extent of the *Krascheninnikovia* association in the Great Plains is in far western Kansas and Oklahoma, but the overall range includes Colorado, New Mexico, and Texas. Throughout its range in the Great Plains, the association is a small patch type that occurs on shallow, rocky soil. The associated flora is more like shortgrass prairie than Great Basin. It was also proposed that *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance (A3202) be revised to exclude northern Great Plains states.

We reviewed the western extent of shortgrass prairie types in New Mexico and whether they extend as far west as Arizona. For our shortgrass prairie concept, we follow Kűchler's geographic concept of the Grama-buffalo grass (type 65), which is restricted to eastern New Mexico and elsewhere in the southern Great Plains, and is distinct from his Great Basin grassland Grama-galleta steppe (type 53) in western New Mexico, Arizona and elsewhere in the Great Basin.

***Juniperus virginiana* (Eastern Red Cedar)**

The occurrence of *Juniperus virginiana* in the Great Plains portion of the USNVC has created challenges. *Juniperus virginiana* occurs in a broad spectrum of ecological settings, either as a component of native prairie associations, in dry rocky woodlands and in ruderal woodlands, or as a native invasive species on degraded native prairie or abandoned agricultural land. On sites where it has become dominant, increasing canopy closure and the accumulation of duff suppresses the growth of and simplifies the diversity of ground layer vegetation.

Invasiveness of red cedar into mixedgrass prairie is a widespread phenomenon (Wang et al. 2018). Here we propose that, given its "weedy" character in the Great Plains grasslands, red cedar not be used as a criterion to classify native associations, but be treated as part of variation within prairie types, until it reaches the point of dominance (perhaps > 25% canopy cover of trees over 5 m tall) and loses the mixedgrass diagnostics (through shading and heavy grazing). At this point, it is treated as a ruderal type, similar to red cedar woodlands on abandoned farmland or pasture.

It was decided that *J. virginiana* var. *virginiana* / *Schizachyrium scoparium* - *Bouteloua curtipendul*a Great Plains Grassland [CEGL004066] and *J. virginiana* var. *virginiana* / *Schizachyrium scoparium* Wooded Grassland [CEGL004209] do not belong in the *Schizachyrium scoparium* - *Bouteloua curtipendula* Central Great Plains Grassland Alliance (A4042), and to alleviate this issue, it was proposed that a Ruderal Great Plains Woodland Group be established and assigned to a *Juniperus virginiana* Ruderal Woodland Alliance. There was a parallel proposal for the recognition of an Eastern Great Plains Woodland Group and *Juniperus virginiana* Great Plains Woodland for non-ruderal vegetation.

IV. Alliance and Association Revisions – Specific Revisions

The many changes to alliances and associations made in combination with revisions to group revisions within the Great Plains are detailed in Appendices A and B.

CONCLUSIONS

Resolving legacy issues within the USNVC, a situation that is not unique to the Great Plains, was the crux of the review process for this workshop. The current structural stability of the hierarchy—the product of revisions in the levels above the alliance—facilitated achieving this goal. The assumption that the EcoVeg approach would provide a practical avenue for revision of the types in question was a guiding principle, and to do so required contextualizing these types within the Great Plains regional climatic gradients. This approach was particularly effective at the group level. Nevertheless, issues still remain.

The floristic distinctions between Northern Great Plains Dry Mixedgrass Prairie (G331) and Northern Great Plains Mesic Mixedgrass Prairie (G141), for example, still need to be discerned, and once complete, will affect the alliance and association members of those groups. Still, from a range-wide perspective, recognition of the former helped to identify the northwestern part of the Great plains grasslands that overlaps with Great Basin sagebrush vegetation. In fact, many broad-based historical maps of the Great Plains have included this dry northern mixedgrass group within the USNVC shortgrass prairie concept (e.g. Shelford 1963). By recognizing this group, we can show the relationship of our prairie types to these historical concepts. But climate alone cannot fully resolve the geography of these groups. For example, grazed northern mixedgrass prairies can have a strong "shortgrass prairie" aspect, which we threated as variants because cessation of grazing can lead to a recovery of the mixedgrass aspect.

Likewise, resolution is still needed for types dominated by woody plant species, both within the Great Plains and between adjoining regions, which are in some cases a product of land-use. The abundance of *Juniperus virginiana*, for example, is often a product of fire suppression and land abandonment. *Yucca glauca* communities present a similar dilemma; are they an expression of the local environment or of overgrazing? The stature of these species also brings into question whether they are best categorized as a forest, woodland, or shrubland.

The expert-based methodology was successful for resolving numerous issues within the Great Plains classification, but not all. Workshop participants acknowledge that certain issues will not be resolved without an increase in regional scale dataset. It is noteworthy that only two groups (the sand grasslands and shrublands) were thoroughly revised, leading to new types. By clarifying group concepts, we could then improve the distribution and concepts of component alliances and associations. We found that consideration of biogeography alongside dominance and ecology appears to provide a reasonable set of criteria for guiding refinement of associations and alliances within groups. But one message rang clear; enhancing the quantitative analysis of plot-based data in the region is imperative to resolving issues at all scales of the classification.

COMPLETED REVISION

In Table 7, we present a summary version of our revisions to Great Plains grasslands, shrublands, and woodlands, along with related vegetation in the prairie-forest border region to the east and Rocky Mountain and sagebrush types to the west.

Table 7. Summary of the revised USNVC hierarchy for Great Plains grasslands, shrublands, and woodlands. The hierarchy is presented in compact form. **Column 1** contains the codes for types of the upper 3 levels of the hierarchy (class, subclass, formation); **column 2** contains, in addition to a brief description of each type for the upper three levels, the codes for the middle three levels (division, macrogroup and group); **column 3** contains, in addition to a brief description and subnational distribution for each type for the middle levels, the codes for the lower two levels, alliance and association; **column 4** contains a brief description and subnational distribution for each alliance and association type (not all types have brief descriptions); **column 5** contains the web link to the full description on the usnvc.org website. Levels of the classification are color coded to aid in interpretation (red = formation, pale blue = group, black = macrogroup, orange = groups, and blue = alliance).

1 2 3 4 5

1. Forest & Woodland

usnvc.org

Tropical, temperate and boreal forests, woodlands and tree savannas characterized by broadly mesomorphic (including scleromorphic) tree growth forms (including *broad-leaved, needle-leaved, sclerophyllous, palm, bamboo trees*, and *tree ferns*), typically with at least 10% cover (but tropical tree savannas up to 40% cover, when trees <8 m tall), irregular horizontal spacing of vegetation structure, and spanning humid to seasonally dry tropical to boreal and subalpine climates and wet to dry substrate conditions. Includes native forests, as well as managed, and some plantation forests where human management is infrequent.

1.B. Temperate & Boreal Forest & Woodland

usnvc.org

Temperate & Boreal Forest & Woodland is typically dominated by broad-leaved deciduous and needle-leaved trees, with some broad-leaved evergreens in warmer regions, and a climate that varies from warm-temperate with only rare frosts to very cold subarctic conditions. It is found across the globe in the mid-latitudes, typically between 25° and 60-70°N and S latitude, and includes boreal, cool-temperate, and warm-temperate/Mediterranean forests.

1.B.2. Cool Temperate Forest & Woodland

usnvc.org

Cool Temperate Forest & Woodland includes temperate deciduous forest and woodland, temperate needle-leaved forest and woodland, and temperate rainforest, dominated by broad-leaved or needle-leaved tree growth forms.

D008. Eastern North American Forest & Woodland

usnvc.org

These eastern North American forests and woodlands are dominated by cold-deciduous broadleaf trees, sometimes mixed with conifers, with strong diagnostic tree species, including *Acer rubrum, Acer saccharum, Carya* spp. (especially *Carya cordiformis, Carya glabra, Carya ovata*), *Fagus grandifolia, Fraxinus americana, Liriodendron tulipifera, Quercus* spp. (especially *Quercus alba, Quercus rubra, Quercus velutina*), and *Tilia americana*.

M502. Appalachian-Northeastern Oak - Hardwood - Pine Forest & Woodland

usnvc.org

This northeastern macrogroup comprises forests characterized by a number of dry-site oak species (*Quercus coccinea, Quercus falcata, Quercus muehlenbergii, Quercus montana, Quercus velutina*) and pine species (*Pinus pungens, Pinus rigida, Pinus virginiana*) occurring on substrates ranging from acidic to substrates of high base status.

G650. Central Appalachian-Northeast Oak Forest & Woodland

usnvc.org

Central Appalachian-Northeast Oak Forest & Woodland

White Oak - Chestnut Oak - Pignut Hickory Forest & Woodland Group

This group encompasses eastern U.S. dry-mesic, largely deciduous forests of intermediate fertility characterized by *Quercus alba, Quercus falcata, Quercus montana, Quercus rubra, Quercus velutina, Fagus grandifolia, Carya glabra, Carya ovata, Carya cordiformis, Carya tomentosa, Fraxinus americana*, and in the southern part of the range, *Liriodendron tulipifera*.

CT, DC, DE, GA, MA, MD, ME, NC, NH, NJ, NY, OH, ON, PA, QC, RI, SC, VA, VT, WV

A4391. Western Allegheny White Oak - Scarlet Oak Forest usnvc.org

Quercus alba - Quercus montana Western Allegheny Forest

White Oak - Quercus montana Western Allegheny Forest

KY, OH, PA, WV

CEGL006433. **Western Allegheny Plateau Oak Barrens** usnvc.org

Quercus alba - (Quercus velutina) / Lespedeza virginica - Eupatorium hyssopifolium Woodland

White Oak - (Black Oak) / Slender Bushclover - Hyssopleaf Thoroughwort Woodland

OH

M012. **Central Midwest Oak Forest, Woodland & Savanna** usnvc.org

This north-central oak - hardwood type, with closed forest to open savanna and barrens structure, is dominated by oak and hickory tree species within glaciated regions of the Midwest, from southern Minnesota to northern Missouri and east to western New York and southern Ontario. It is found on dry to dry-mesic sites on primarily glaciated sandy to loamy soils. Fire is critical to maintaining the oak species and the diverse herb and shrub layers.

G181. **Central Midwest Oak Openings & Barrens** usnvc.org

Central Midwest Oak Openings & Barrens

Bur Oak - Black Oak / Big Bluestem Savanna & Barrens Group

The deep-loam to sandy oak savanna (oak openings and oak barrens) occurs in the tallgrass prairie regions of the central United States, where scattered trees (10 to 30% cover) occur over a more-or-less continuous tallgrass prairie layer. Trees are *Populus tremuloides, Quercus alba, Quercus bicolor, Quercus macrocarpa*, and/or *Quercus stellata*, and dominant graminoids include *Andropogon gerardii, Schizachyrium scoparium, Sorghastrum nutans, Sporobolus heterolepis*, and/or *Hesperostipa spartea*.

IA, IL, IN, MB, MI, MN, MO, ND, NE, NY, OH, ON, PA, SD, WI

A1492. **Black Oak - Northern Pin Oak Barrens** usnvc.org

Quercus velutina - Quercus ellipsoidalis Wooded Grassland Alliance

Black Oak - Northern Pin Oak Wooded Grassland Alliance

This fire-dependent oak barrens alliance is found on drier substrates in the Great Lakes region and northeastern Great Plains. Trees are scattered to clumped within a grassy matrix and dominated by *Quercus macrocarpa* and *Quercus ellipsoidalis*.

IA?, IL, IN, MI, MN, ND, OH, ON, PA?, WI

CEGL002160. **Northern Oak Barrens** usnvc.org

Quercus macrocarpa - (Quercus ellipsoidalis) / Schizachyrium scoparium - Koeleria macrantha Wooded Grassland

Bur Oak - (Northern Pin Oak) / Little Bluestem - Prairie Junegrass Open Woodland

MN, ND

CEGL002492. **Black Oak / Lupine Barrens** usnvc.org

Quercus velutina - Quercus ellipsoidalis - (Quercus alba) / Schizachyrium scoparium - Lupinus perennis Wooded Grassland

Black Oak - Northern Pin Oak - (White Oak) / Little Bluestem - Sundial Lupine Open Woodland

IA?, IL, IN, MI, MN, OH, ON, PA?, WI

A3256. **Tallgrass Bur Oak Openings** usnvc.org

Quercus macrocarpa - Quercus alba Wooded Grassland Alliance

Bur Oak - White Oak Wooded Grassland Alliance

This fire-dependent, open woodland (or savanna) type is found in the midwestern United States and southern Canada, and is characterized by a dry-mesic and mesic tallgrass prairie understory and open oak canopy dominated by *Quercus macrocarpa*, sometimes with *Populus tremuloides, Quercus alba, Quercus bicolor*, and *Quercus stellata*. It is typically found on rolling outwash plains, hills, and ridges, as well as lakeplains near the Great Lakes.

IA, IL, IN, MB, MI, MN, MO, ND, NE, NY, OH, ON, PA?, SD, WI

CEGL002020. **North-Central Bur Oak Openings** usnvc.org

Quercus macrocarpa - (Quercus alba, Quercus velutina) / Andropogon gerardii Wooded Grassland

Bur Oak - (White Oak, Black Oak) / Big Bluestem Wooded Grassland

IA?, IL, IN, MI?, MN, WI

CEGL002158. **Northern Tallgrass Bur Oak Openings** usnvc.org

Quercus macrocarpa Northern Tallgrass Wooded Grassland

Bur Oak Northern Tallgrass Wooded Grassland

IA?, MB, MN, ND, NE, ON, SD

CEGL002159. **Central Bur Oak Openings** usnvc.org

Quercus macrocarpa - (Quercus alba, Quercus stellata) / Andropogon gerardii Wooded Grassland

Bur Oak - (White Oak, Post Oak) / Big Bluestem Open Woodland

IL, MO, NE, OH

CEGL005120. **Lakeplain Wet-Mesic Oak Openings** usnvc.org

Quercus macrocarpa - Quercus palustris - Quercus bicolor / Calamagrostis canadensis Wooded Grassland

Bur Oak - Pin Oak - Swamp White Oak / Bluejoint Open Woodland

MI, ON, PA?

CEGL005121. **White Oak - Bur Oak Openings** usnvc.org

Quercus alba - Quercus macrocarpa / Andropogon gerardii Wooded Grassland

White Oak - Bur Oak / Big Bluestem Open Woodland

MI, NY, ON, QC?

G649. North-Central Oak - Hickory Forest & Woodland usnvc.org

North-Central Oak - Hickory Forest & Woodland

North-Central Oak - Hickory Forest & Woodland Group

Deciduous or rarely mixed conifer-deciduous forests and woodlands found largely in the glaciated midwestern United States where mesic to dry-mesic forests are dominated by *Quercus alba, Quercus rubra*, and *Quercus velutina*, often with *Carya* spp. present to codominant.

IA, IL, IN, KS, MI, MN, MO, NE, NY, OH, ON, PA, QC, WI

A0620. Great Plains Bur Oak Woodland usnvc.org

Quercus macrocarpa Central Tallgrass Woodland Alliance

Bur Oak Central Tallgrass Woodland Alliance

This alliance is widespread in the central tallgrass region on mesic or dry-mesic sites with an open to moderately closed tree canopy dominated by *Quercus macrocarpa*.

IA, KS, MB?, MO, NE, OK, SD?

CEGL002052.	**Central Tallgrass Bur Oak Bottomland Woodland** *Quercus macrocarpa / Andropogon gerardii - Panicum virgatum* Woodland Bur Oak / Big Bluestem - Switchgrass Woodland KS, NE, OK?	usnvc.org
CEGL002053.	**Central Tallgrass Bur Oak Mesic Woodland** *Quercus macrocarpa / Andropogon gerardii - Hesperostipa spartea* Woodland Bur Oak / Big Bluestem - Porcupine Grass Woodland IA, KS, MO, NE, SD	usnvc.org
CEGL002072.	**Central Bur Oak Mesic Forest** *Quercus macrocarpa / Cornus drummondii / Aralia nudicaulis* Forest Bur Oak / Roughleaf Dogwood / Wild Sarsaparilla Forest IA, NE, SD	usnvc.org
CEGL002145.	**Chinquapin Oak - Bur Oak Ravine Woodland** *Quercus muehlenbergii - Quercus macrocarpa / Andropogon gerardii* Ravine Woodland Chinquapin Oak - Bur Oak / Big Bluestem Ravine Woodland KS	usnvc.org
A3237.	**White Pine - Oak Driftless Forest & Woodland** *Pinus strobus - Quercus* spp. Driftless Forest & Woodland Alliance Eastern White Pine - Oak species Driftless Forest & Woodland Alliance This alliance contains white pine-dominated and mixed pine - oak forests and woodlands found within the Driftless area of Minnesota, Wisconsin, Iowa and Illinois. Stands typically occur on mostly dry sites and rocky outcrops along bluffs. *Pinus strobus* typically dominates. *Pinus resinosa*, oak species such as *Quercus alba*, *Quercus rubra*, *Quercus muehlenbergii*, or *Juniperus virginiana var. virginiana* are common associates and may be locally dominant in some areas. IA, IL, MN, WI	usnvc.org
CEGL002378.	**White Pine - Red Pine Driftless Bluff Forest** *Pinus strobus - (Pinus resinosa)* Driftless Bluff Forest Eastern White Pine - (Red Pine) Driftless Bluff Forest IA, MN?, WI	usnvc.org
CEGL005561.	**Eastern White Pine - Oak Driftless Bluff Forest** *Pinus strobus - Quercus (alba, rubra, velutina)* Driftless Bluff Forest Eastern White Pine - (White Oak, Northern Red Oak, Black Oak) Driftless Bluff Forest MN, WI	usnvc.org
A3323.	**North-Central White Oak - Hickory Forest**	usnvc.org

Quercus alba - *Quercus rubra* - *Carya* spp. North-Central Forest Alliance

White Oak - Northern Red Oak - Hickory species North-Central Forest Alliance

This dry-mesic oak forest alliance is found throughout the central Midwest region of the United States. Stands occur primarily on glaciated, rolling topography on dry-mesic soils. *Quercus alba* and *Quercus rubra* are the typical dominants, but *Carya ovata* can also be codominant.

IA, IL, IN, KS, MI, MN, MO, NE, OH, ON, WI

CEGL002011. **Midwest White Oak - Hickory Forest** usnvc.org

Quercus alba - *(Quercus velutina)* - *Carya ovata / Ostrya virginiana* Forest

White Oak - (Black Oak) - Shagbark Hickory / Hophornbeam Forest

IA, KS, MO, NE, OK

CEGL002068. **Midwest White Oak - Red Oak Forest** usnvc.org

Quercus alba - *Quercus rubra* - *Carya ovata* Midwest Forest

White Oak - Northern Red Oak - Shagbark Hickory Midwest Forest

IA, IL, IN, MI, MN, MO, OH, ON, WI

A3324. **White Oak - Bur Oak - Swamp White Oak Woodland** usnvc.org

Quercus alba - *Quercus macrocarpa* - *Quercus bicolor* Woodland Alliance

White Oak - Bur Oak - Swamp White Oak Woodland Alliance

This alliance, found primarily in the central midwestern United States and southwestern Ontario, Canada, includes oak woodlands of dry to moist soils dominated by *Quercus alba, Quercus macrocarpa*, or less commonly *Quercus bicolor*. *Carya ovata, Quercus ellipsoidalis, Quercus palustris, Quercus velutina*, and *Acer rubrum* are occasional canopy associates.

IA, IL, IN, MI, MN, MO, ON, WI

CEGL002065. **Midwest Bur Oak - Aspen Forest** usnvc.org

Quercus macrocarpa - *Populus tremuloides / Aralia nudicaulis* Forest

Bur Oak - Quaking Aspen / Wild Sarsaparilla Forest

IA, MN, ND, SD

CEGL002134. **Central Midwest White Oak - Mixed Oak Woodland** usnvc.org

Quercus alba - *(Carya ovata) / Carex pensylvanica* Glaciated Woodland

White Oak - (Shagbark Hickory) / Pennsylvania Sedge Glaciated Woodland

IA, IL, MO

CEGL002142. **North-Central Dry-Mesic Oak Woodland** usnvc.org

Quercus alba - *Quercus macrocarpa* - *Quercus rubra / Corylus americana* Woodland

White Oak - Bur Oak - Northern Red Oak / American Hazelnut Woodland

IA, IL, IN, MN, WI

CEGL002144.	**Chinquapin Oak Driftless Bluff Woodland** *Quercus muehlenbergii - Quercus (alba, velutina) - (Juniperus virginiana)* Driftless Bluff Woodland Chinquapin Oak - (White Oak, Black Oak) - (Eastern Red-cedar) Driftless Bluff Woodland IA, IL?, MN, WI	usnvc.org
CEGL005054.	**Lakeplain Mesic Oak Woodland** *Quercus alba - Quercus velutina - Quercus palustris / Carex pensylvanica* Woodland White Oak - Black Oak - Pin Oak / Pennsylvania Sedge Woodland MI, ON	usnvc.org
CEGL005181.	**Swamp White Oak Woodland** *Quercus bicolor - (Quercus macrocarpa, Quercus stellata)* Woodland Swamp White Oak - (Bur Oak, Post Oak) Woodland IA, IL	usnvc.org
CEGL005281.	**Central Tallgrass Post Oak Woodland** *Quercus stellata - Quercus velutina / Schizachyrium scoparium* Woodland Post Oak - Black Oak / Little Bluestem Woodland IA?, IL, MO	usnvc.org
CEGL005560.	**Bur Oak - Mixed Oak Woodland** *Quercus macrocarpa - Quercus (alba, ellipsoidalis, velutina)* Woodland Bur Oak - (White Oak, Northern Pin Oak, Black Oak) Woodland IA, IN?, MN, WI	usnvc.org
A3326.	**North-Central Black Oak - White Oak Forest** *Quercus velutina - Quercus alba* North-Central Forest Alliance Black Oak - White Oak North-Central Forest Alliance This dry oak forest alliance is found throughout the central midwestern United States and southwestern Ontario, Canada. Examples occur on dry to dry-mesic sandy or rocky soils. The tree canopy is moderately closed, occasionally scrubby, and with typically 50-100% cover, with *Quercus velutina* as the dominant tree species, and *Quercus alba* and *Carya* spp. as common associates. IA, IL, IN, MI, MN, MO, OH, ON, PA?, WI	usnvc.org
CEGL002076.	**Black Oak - White Oak - Hickory Forest** *Quercus velutina - Quercus alba - Carya (glabra, ovata)* Forest Black Oak - White Oak - (Pignut Hickory, Shagbark Hickory) Forest IA?, IL, IN, MI, MO, OH, ON, PA?	usnvc.org
CEGL002078.	**Black Oak Forest**	usnvc.org

Quercus velutina / Carex pensylvanica Forest

Black Oak / Pennsylvania Sedge Forest

IA, IL, IN, MN, WI

CEGL005029. **Black Oak - Northern Pin Oak / Wavy Hairgrass Woodland** usnvc.org

Quercus velutina - (Quercus ellipsoidalis) - Quercus alba / Deschampsia flexuosa Woodland

Black Oak - (Northern Pin Oak) - White Oak / Wavy Hairgrass Woodland

IN, MI, ON

CEGL005030. **Black Oak - White Oak / Blueberry Forest** usnvc.org

Quercus velutina - Quercus alba / Vaccinium (angustifolium, pallidum) / Carex pensylvanica Forest

Black Oak - White Oak / (Lowbush Blueberry, Blue Ridge Blueberry) / Pennsylvania Sedge Forest

IL, IN, MI, OH, ON

M882. Central Midwest Mesic Forest usnvc.org

These hardwood forests are dominated by a mixture of *Acer saccharum*, *Fagus grandifolia*, *Quercus rubra*, and *Tilia americana* found on rich, mesic sites in the central hardwood region of the Midwest from Ohio to the Ozark/Ouachita regions and west into the eastern Great Plains.

G021. North-Central Beech - Maple - Basswood Forest usnvc.org

North-Central Beech - Maple - Basswood Forest

American Beech - Sugar Maple - Oak species Forest Group

Stands occur throughout the central United States, reaching into southern Canada, on mesic, rich loam soils and are dominated by hardwood species with rich and diverse understories. *Acer saccharum*, *Fagus grandifolia*, *Quercus rubra*, and *Tilia americana* are the most common canopy species. Due to conversion to agriculture, logging, browsing and grazing, the range of this group has significantly decreased and very few large stands remain.

IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, ON, SD, WI

A0220. Sugar Maple - American Basswood - Northern Red Oak Forest usnvc.org

Acer saccharum - Tilia americana - Quercus rubra Forest Alliance

Sugar Maple - American Basswood - Northern Red Oak Forest Alliance

This alliance, found in the midwestern United States, forms the westernmost portion of the mesic deciduous forests that occupy much of the eastern United States. Stands of this alliance are found on well-drained, nutrient-rich loamy soils and have a moderately dense to dense tree canopy dominated by some combination of *Acer saccharum*, *Quercus rubra*, and *Tilia americana*.

IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, ON, SD, WI

CEGL002013. **Paper Birch Canyon Forest** usnvc.org

Betula papyrifera - (Tilia americana, Quercus macrocarpa) Canyon Forest

Paper Birch - (American Basswood, Bur Oak) Canyon Forest

NE, SD

M159. Laurentian-Acadian Pine - Hardwood Forest & Woodland usnvc.org

These Laurentian-Acadian pine-oak forests have closed to open canopies dominated by pines (*Pinus banksiana, Pinus resinosa, Pinus strobus*) with a mix of oak species (*Quercus ellipsoidalis, Quercus rubra*) and other hardwoods, over an often heathy shrub layer. Sites typically occur on sandplains, outwash habitats, and coarse glacial deposits of sandy or loamy soils with dry to dry-mesic moisture conditions and occasional to frequent fires.

G025. **Laurentian-Acadian Pine - Oak Forest & Woodland** usnvc.org

Laurentian-Acadian Pine - Oak Forest & Woodland

Eastern White Pine - Jack Pine - Northern Red Oak Forest & Woodland Group

This conifer - hardwood woodland is found across the northern Great Lakes and east to northern New England and Quebec, Canada. It is dominated by a combination of *Pinus strobus, Pinus banksiana*, and *Pinus resinosa* with northern hardwood species such as *Acer* spp., *Populus* spp., and *Quercus* spp. occurring as canopy associates or forming a subcanopy. Sites typically occur on coarse glacial deposits of sandy or loamy soils.

ME, MI, MN, NB, NH, NS?, NY, ON, PE?, QC, VT, WI

A4127. **White Pine - Red Pine - Northern Red Oak Forest & Woodland** usnvc.org

Pinus strobus - Pinus resinosa - Quercus rubra Forest & Woodland Alliance

Eastern White Pine - Red Pine - Northern Red Oak Forest & Woodland Alliance

This alliance contains pine-dominated and mixed pine - oak forests and woodlands found in the upper Midwest and New England of the United States, and in eastern temperate Canada on mostly mesic and dry-mesic sites within glaciated landscapes.

ME, MI, MN, NB, NH, NS?, NY, ON, QC, VT, WI

CEGL002481. **White Pine - White Oak Sand Forest** usnvc.org

Pinus strobus - Quercus alba / (Corylus americana, Gaylussacia baccata) Forest

Eastern White Pine - White Oak / (American Hazelnut, Black Huckleberry) Forest

MI, MN, WI

D194. Rocky Mountain Forest & Woodland usnvc.org

This division is composed of forests, woodlands and savannas of the lower montane to subalpine zones of the 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 x albertiana, 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, Thuja plicata*, and *Tsuga heterophylla*.

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

Conifer forests, woodlands and savannas of *Pinus ponderosa* and *Pseudotsuga menziesii*, with *Pinus flexilis* and *Juniperus scopulorum*, found on dry settings of the lower montane to foothill zones of the interior Pacific Northwest, and extending east into the northwestern Great Plains regions.

G209. **Rocky Mountain Foothill-Rock Outcrop Limber Pine - Juniper Woodland** usnvc.org

Rocky Mountain Foothill-Rock Outcrop Limber Pine - Juniper Woodland

Limber Pine - Rocky Mountain Juniper Rocky Mountain Foothill Woodland Group

This foothill woodland group is found on rocky sites in the Rocky Mountains from southern Alberta to central Colorado, including escarpments and low hills across Wyoming and the western Great Plains, and is characterized by an open-tree canopy or patchy woodland that is dominated by either *Pinus flexilis, Juniperus osteosperma*, or *Juniperus scopulorum*.

AB, CO, ID, MT, ND, NE, SD, UT, WY

A3424.	**Central Rocky Mountain Limber Pine / Shrub Woodland** *Pinus flexilis* / Shrub Understory Central Rocky Mountain Woodland Alliance Limber Pine / Shrub Understory Central Rocky Mountain Woodland Alliance This foothill and outcrop woodland alliance occurs along the eastern slope of the central Rocky Mountains and adjacent Great Plains. It is dominated by *Pinus flexilis* and may be codominated by *Juniperus scopulorum* or, less commonly, *Juniperus osteosperma* with an understory characterized by an open to moderately dense shrub layer. Herbaceous cover is typically low with less than cover than the shrubs. AB, CO, ID, MT, SD, WY	usnvc.org
CEGL000808.	**Limber Pine / Utah Juniper Woodland** *Pinus flexilis / Juniperus osteosperma* Woodland Limber Pine / Utah Juniper Woodland MT, WY?	usnvc.org
CEGL000809.	**Limber Pine / Rocky Mountain Juniper Woodland** *Pinus flexilis / Juniperus scopulorum* Woodland Limber Pine / Rocky Mountain Juniper Woodland MT, OR, WY	usnvc.org
CEGL000813.	**Limber Pine / Bluebunch Wheatgrass Woodland** *Pinus flexilis / Pseudoroegneria spicata* Woodland Limber Pine / Bluebunch Wheatgrass Woodland MT, ND, WY	usnvc.org
CEGL000814.	**Limber Pine / Antelope Bitterbrush Woodland** *Pinus flexilis / Purshia tridentata* Woodland Limber Pine / Antelope Bitterbrush Woodland ID	usnvc.org
CEGL005320.	**Limber Pine / Alderleaf Mountain-mahogany - Utah Serviceberry Woodland** *Pinus flexilis / Cercocarpus montanus - Amelanchier utahensis* Woodland Limber Pine / Alderleaf Mountain-mahogany - Utah Serviceberry Woodland WY	usnvc.org
CEGL005603.	**Limber Pine / Desert-sweet / Sandberg Bluegrass Open Woodland** *Pinus flexilis / Chamaebatiaria millefolium / Poa secunda* Open Woodland Limber Pine / Desert-sweet / Sandberg Bluegrass Open Woodland ID	usnvc.org
A3427.	**Central Rocky Mountain Juniper / Grass Woodland**	usnvc.org

Juniperus osteosperma - Juniperus scopulorum / Grass Understory Central Rocky Mountain Woodland Alliance

Rocky Mountain Juniper - Utah Juniper / Grass Understory Central Rocky Mountain Woodland Alliance

This foothill and outcrop alliance primarily occurs along the eastern slope of the central Rocky Mountains and adjacent Great Plains, but extends from Colorado to Alberta. Stands have an open canopy dominated by *Juniperus scopulorum* or, less commonly, *Juniperus osteosperma* with understory characterized by a moderately dense to low perennial grass layer. If shrubs are present, then cover is low (<10%) and perennial grass cover exceeds shrub cover.

AB, CO, ID, MT, NE, SD, WY

CEGL000747. **Rocky Mountain Juniper / Little-seed Ricegrass Woodland** usnvc.org

Juniperus scopulorum / Piptatheropsis micrantha Woodland

Rocky Mountain Juniper / Little-seed Ricegrass Woodland

CO, MT, ND, NE, SD, WY

M020. Rocky Mountain Subalpine-High Montane Forest usnvc.org

This is a diverse macrogroup of high montane and subalpine forests and woodland found throughout the mountainous regions of the western U.S. and southwestern Canada.

G222. Rocky Mountain Subalpine-Montane Aspen Forest & Woodland usnvc.org

Rocky Mountain Subalpine-Montane Aspen Forest & Woodland

Quaking Aspen Rocky Mountain Forest & Woodland Group

This group consists of upland forests dominated by *Populus tremuloides* 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.

AB, AZ, BC, CA, CO, ID, MT, ND, NM, NV, OR, SD, TX, UT, WA, WY

A2036. Rocky Mountain Aspen Forest & Woodland usnvc.org

Populus tremuloides Rocky Mountain Forest & Woodland Alliance

Quaking Aspen Rocky Mountain Forest & Woodland Alliance

This alliance is widespread in the southern, central and northern Rocky Mountains, west to the Sierra Nevada and east to the Black Hills and defined by a canopy dominated by *Populus tremuloides*.

AB, AZ, BC, CA, CO, ID, MT, ND, NM, NV, OR, SD, TX?, UT, WA, WY

CEGL000596. **Aspen / Chokecherry Forest** usnvc.org

Populus tremuloides / Prunus virginiana Forest

Quaking Aspen / Chokecherry Forest

CO, ID, MT, ND, OR, SD, UT, WY

D326. North American Great Plains Forest & Woodland usnvc.org

This division contains aspen, oak and mixed hardwood woodlands dominated by *Quercus macrocarpa, Populus tremuloides*, or *Betula papyrifera*, often with an understory dominated by prairie shrubs, grasses and forbs that are more

tolerant of shade. It is found throughout the northern Great Plains, from central Kansas to the Canadian aspen parkland region.

M151. **Great Plains Forest & Woodland** usnvc.org

This macrogroup contains aspen, oak, and mixed hardwood woodlands dominated by *Quercus macrocarpa*, *Populus tremuloides*, or *Betula papyrifera*, often with an understory dominated by prairie shrubs, grasses and forbs that are more tolerant of shade. It is found throughout northern Great Plains, from central Kansas to the Canadian aspen parkland region.

G329. **Great Plains Bur Oak Forest & Woodland** usnvc.org

Great Plains Bur Oak Forest & Woodland

Bur Oak - Hazelnut species / Sedge species Forest & Woodland Group

This group is dominated by *Quercus macrocarpa* and is found in upland areas in the northern part of the Great Plains.

KS, MB, MN, MT, ND, NE, OK?, SD, SK, WY

A1505. **Bur Oak / Mixedgrass Woodland** usnvc.org

Quercus macrocarpa / Mixedgrass Woodland Alliance

Bur Oak / Mixedgrass Woodland Alliance

This alliance, found in the northern Great Plains, is a mixedgrass savanna and woodland. Scattered and clumped trees are always present, and the tree stratum varies from 10 to 60% cover. *Quercus macrocarpa* is the most common tree while mid grasses and tall grasses dominate the ground layer.

MB, ND, SD, WY

CEGL000554. **Great Plains Bur Oak / Sedge Woodland** usnvc.org

Quercus macrocarpa / Carex inops ssp. heliophila Woodland

Bur Oak / Sun Sedge Woodland

SD, WY

CEGL000555. **Great Plains Bur Oak / Hophornbeam Forest** usnvc.org

Quercus macrocarpa / Ostrya virginiana Forest

Bur Oak / Hophornbeam Forest

SD, WY

CEGL002137. **Great Plains Bur Oak / Hazelnut Woodland** usnvc.org

Quercus macrocarpa / Corylus cornuta Woodland

Bur Oak / Beaked Hazelnut Woodland

ND, SD, SK

CEGL002138. **Bur Oak / Chokecherry - Western Snowberry Woodland** usnvc.org

Quercus macrocarpa / Prunus virginiana - Symphoricarpos occidentalis Woodland

Bur Oak / Chokecherry - Western Snowberry Woodland

ND, SD, WY

CEGL002162. **Great Plains Bur Oak / Mixedgrass Sand Wooded Grassland** usnvc.org

Quercus macrocarpa / Mixedgrass Sand Wooded Grassland

Bur Oak / Mixedgrass Sand Wooded Grassland

MB, ND, SD

CEGL002163. **Great Plains Bur Oak / Mixedgrass Loam Wooded Grassland** usnvc.org

Quercus macrocarpa / Mixedgrass Loam Wooded Grassland

Bur Oak / Mixedgrass Loam Wooded Grassland

MB, ND

CEGL002164. **Great Plains Bur Oak / Mixedgrass Shale Wooded Grassland** usnvc.org

Quercus macrocarpa / Mixedgrass Shale Wooded Grassland

Bur Oak / Mixedgrass Shale Wooded Grassland

SD

G145. Great Plains Mesic Forest & Woodland usnvc.org

Great Plains Mesic Forest & Woodland

Green Ash - American Elm / Cherry species Forest & Woodland Group

This group is found in the northern Great Plains and has an open to closed tree canopy dominated by *Betula papyrifera*, *Fraxinus pennsylvanica*, *Populus tremuloides*, *Ulmus americana*, *Ulmus rubra*, and *Juniperus scopulorum* and sometimes the tall shrubs *Crataegus douglasii* and *Crataegus succulenta*. It is found in valleys, ravines, and mesic slopes.

AB?, CO, MB, MT, ND, NE, SD, SK, WY

A3211. Great Plains Ash - Elm Ravine Forest usnvc.org

Fraxinus pennsylvanica - Ulmus americana Great Plains Forest Alliance

Green Ash - American Elm Great Plains Forest Alliance

This alliance is found in mesic ravines or draws in the northern and central Great Plains with an open to closed short tree canopy typically dominated by *Fraxinus pennsylvanica* and *Ulmus americana*.

MB, MT, ND, NE, SD, SK, WY

CEGL000643. **Green Ash - Elm Woody Draw** usnvc.org

Fraxinus pennsylvanica - Ulmus americana / Prunus virginiana Woodland

Green Ash - American Elm / Chokecherry Woodland

MT, ND, NE, SD

CEGL002082. **Green Ash - Elm / Snowberry Forest** usnvc.org

Fraxinus pennsylvanica - Ulmus americana / Symphoricarpos occidentalis Forest

Green Ash - American Elm / Western Snowberry Forest

MB, ND, SD, WY

G146. **Northeastern Great Plains Aspen Woodland** usnvc.org

Northeastern Great Plains Aspen Woodland

Quaking Aspen - Bur Oak / Big Bluestem Woodland Group

This group is found on the northeastern border of the Great Plains and boreal forests and is characterized by a mosaic of tallgrass prairie, wet prairie, brush prairie, and aspen-oak woodlands dominated by *Populus tremuloides*.

MB, MN, ND, ON, SK

A3209. **Northern Great Plains Birch - Aspen Forest** usnvc.org

Betula papyrifera - Populus tremuloides - Quercus macrocarpa Forest Alliance

Paper Birch - Quaking Aspen - Bur Oak Forest Alliance

This alliance consists of forests along ravines, draws, and intermittent streams and on mesic, protected slopes in the northern half of the central and eastern Great Plains. The canopy is moderately closed to closed and usually dominated by some combination of *Betula papyrifera* and *Populus tremuloides*.

MB, ND, NE, SD, SK, WY

CEGL002079. **Paper Birch / Hazelnut Forest** usnvc.org

Betula papyrifera / Corylus cornuta Forest

Paper Birch / Beaked Hazelnut Forest

ND, SD, WY

CEGL002129. **Paper Birch / Creeping Juniper Shale Woodland** usnvc.org

Betula papyrifera / Juniperus horizontalis Shale Woodland

Paper Birch / Creeping Juniper Shale Woodland

ND

A3249. **Aspen Parklands Forest** usnvc.org

Populus tremuloides - Populus balsamifera / Corylus americana Forest Alliance

Quaking Aspen - Balsam Poplar / American Hazelnut Forest Alliance

This alliance includes mesic and wet forests dominated by *Populus tremuloides* or *Populus balsamifera* in the Aspen Parklands areas of south-central Canada and the north-central U.S. A short to medium-tall shrub layer is nearly always present.

MB, MN, ND, SK

CEGL002063. **Aspen / American Hazel Forest** usnvc.org

Populus tremuloides / Corylus americana Forest

Quaking Aspen / American Hazelnut Forest

MN

CEGL002097. **Aspen Prairie Lowland Forest** usnvc.org

Populus tremuloides - Populus balsamifera / Calamagrostis canadensis - Spartina pectinata Forest

Quaking Aspen - Balsam Poplar / Bluejoint - Prairie Cordgrass Forest

MB, MN, ND, SK

A3250. **Aspen Parkland Bur Oak Woodland** usnvc.org

Populus tremuloides - Quercus macrocarpa / Corylus spp. Woodland Alliance

Quaking Aspen - Bur Oak / Hazelnut species Woodland Alliance

This alliance consists of grasslands of limestone slopes and associated seeps of the Edwards Plateau and central Oklahoma where *Muhlenbergia reverchonii* is dominant or codominant. Soils are tight clay soils that are wet in spring.

MB, MN, ND, ON

CEGL000556. **Bur Oak / Hazelnut Woodland** usnvc.org

Quercus macrocarpa / Corylus americana - Amelanchier alnifolia Woodland

Bur Oak / American Hazelnut - Saskatoon Serviceberry Woodland

MB?, ND, SK?

CEGL002139. **Bur Oak - Aspen Woodland** usnvc.org

Quercus macrocarpa - Populus tremuloides / Corylus spp. Woodland

Bur Oak - Quaking Aspen / Hazelnut species Woodland

MB, MN, ND, ON

CEGL005205. **Aspen Parkland Tallgrass Woodland** usnvc.org

Populus tremuloides / Corylus spp. / *Andropogon gerardii* Woodland

Quaking Aspen / Hazelnut species / Big Bluestem Woodland

MB, MN, ND

G328. **Northwestern Great Plains Aspen Woodland** usnvc.org

Northwestern Great Plains Aspen Woodland

Quaking Aspen / Western Snowberry / Plains Rough Fescue Woodland Group

This group occurs in the transition zone from the grasslands of the Great Plains to the boreal forests where *Populus tremuloides* dominates small woodland patches, which vary from open, grassy to shaded shrub and forb understories.

AB, MB, ND, SK

A3248. **Aspen Parklands Birch Woodland** usnvc.org

Betula papyrifera - Populus tremuloides / Corylus cornuta Woodland Alliance

Paper Birch - Quaking Aspen / Beaked Hazelnut Woodland Alliance

This alliance consists of *Betula papyrifera*-dominated woodlands in the northwestern Great Plains.

AB?, MB, ND, SK

CEGL002128. **Paper Birch / Beaked Hazel Woodland** usnvc.org

Betula papyrifera / Corylus cornuta Woodland

Paper Birch / Beaked Hazelnut Woodland

MB, ND, SK

CEGL002130. **Aspen / Chokecherry Woodland** usnvc.org

Populus tremuloides / Prunus virginiana Woodland

Quaking Aspen / Chokecherry Woodland

MB, ND, SK, WY

887 Cross Timbers Forest & Woodland

Quercus stellata - Quercus marilandica Forest & Woodland Group

Post Oak – Blackjack Oak Forest & Woodland Group

A3216 Northern Crosstimbers Post Oak - Blackjack Oak Woodland

Quercus stellata - Quercus marilandica Forest & Woodland Alliance

AR, KS, OK, TX

A3217 Southern Cross Timbers & Texas Post Oak -Oak Woodland

Quercus stellata - Ulmus crassifolia Forest & Woodland Alliance

AR, OK?, TX

A3218 Western Post Oak - Blackjack Oak Woodland

Quercus stellata - Quercus marilandica / Rhus trilobata Woodland Alliance

OK, TX

A0627. Wingleaf Soapberry Scrub Woodland Alliance usnvc.org

Sapindus saponaria Scrub Woodland Alliance

Wingleaf Soapberry Scrub Woodland Alliance

This alliance includes patchy woodlands in western Oklahoma often consisting of scattered clonal mottes of *Sapindus saponaria*.

OK, TX

CEGL004535. **Soapberry Talus & Dune Woodland** usnvc.org

Sapindus saponaria var. drummondii Woodland

Western Soapberry Woodland

OK, TX?

A4395. Great Plains Red-Cedar Woodland usnvc.org

Juniperus virginiana Woodland Alliance

Eastern Red-cedar Woodland Alliance

This juniper woodland type occurs in the southcentral Great Plains. It occurs naturally in mixedgrass prairies, but is most common in sites that are heavily grazed or lack fire, or in some rocky glade like habitats.

IA?, KS, MN?, MO?, NE, OK, SD, TX

CEGL004209. **Central Plains Red-cedar Woodland** usnvc.org

Juniperus virginiana / *Schizachyrium scoparium* - *Amphiachyris dracunculoides* Woodland

Eastern Red-cedar / Little Bluestem - Prairie Broomweed Woodland

KS, NE, OK

M524. Great Plains Ruderal Woodland usnvc.org

G892. Great Plains Exotic Ruderal Woodland usnvc.org

Great Plains Exotic Ruderal Woodland

Great Plains Exotic Ruderal Woodland

A4396. Great Plains Exotic Hardwood Woodland usnvc.org

Robinia pseudoacacia - Exotic Hardwoods Ruderal Woodland Alliance

Black Locust - Exotic Hardwoods Ruderal Woodland Alliance

This type is found in the Great Plains and dominated by a variety of exotic hardwoods, particularly *Robinia pseudoacacia*.

OK

CEGL008288. **Black Locust Ruderal Woodland** usnvc.org

Robinia pseudoacacia Ruderal Woodland

Black Locust Ruderal Woodland

OK

1.B.3. Temperate Flooded & Swamp Forest usnvc.org

Temperate Flooded & Swamp Forest is a tree-dominated wetland influenced by minerotrophic groundwater, either on mineral or organic (peat) soil, found in mid-latitudes of the globe.

D011. Eastern North American-Great Plains Flooded & Swamp Forest usnvc.org

This division includes 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), ranging across much of cool-temperate eastern North America.

M029. Central Hardwood Floodplain Forest usnvc.org

The macrogroup includes hardwood floodplain forests typically dominated by a combination of *Acer negundo, Acer saccharinum, Celtis laevigata, Celtis occidentalis, Fraxinus pennsylvanica, Liquidambar styraciflua, Platanus occidentalis, Populus deltoides*, and/or *Ulmus americana*. It occurs in the central, south-central, and north-central U.S. and extreme southern Ontario and Quebec in Canada.

G652. Silver Maple - Green Ash - Sycamore Floodplain Forest usnvc.org

Silver Maple - Green Ash - Sycamore Floodplain Forest

Silver Maple - Green Ash - American Sycamore Floodplain Forest Group

The group includes hardwood floodplain forests in the central and north-central U.S. and extreme southern Ontario in Canada, and is typically dominated by *Acer saccharinum*, *Fraxinus pennsylvanica*, *Platanus occidentalis*, or *Acer rubrum*.

AL, AR, IA, IL, IN, KS, KY, MB, MI, MN, MO, MS, ND, NE, OH, OK, ON, PA, TN, WI

A3713. **Midwest Mesic Floodplain Forest** usnvc.org

Fraxinus pennsylvanica - Tilia americana - Quercus spp. Mesic Floodplain Alliance

Green Ash - American Basswood - oak spp. Mesic Floodplain Alliance

This bur oak - hardwoods bottomland forest alliance occurs in the central midwestern United States and possibly southern Ontario, Canada. The tree canopy contains *Quercus macrocarpa, Quercus bicolor*, and *Carya laciniosa*.

AR, IA, IL, IN, KS, KY, MN, MO, OH, OK, ON, WI

CEGL002140. **Bur Oak Bottomland Woodland** usnvc.org

Quercus macrocarpa - Quercus bicolor - (Celtis occidentalis) Woodland

Bur Oak - Swamp White Oak - (Common Hackberry) Woodland

IL, MO, WI

2. Shrub & Herb Vegetation usnvc.org

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*) with an irregular horizontal canopy structure, mesomorphic trees typically <10% cover (but tropical tree savannas typically <40%), tropical to boreal and subalpine climates, and wet to dry substrate conditions.

2.B. Temperate & Boreal Grassland & Shrubland usnvc.org

Temperate & Boreal Grassland & Shrubland is dominated by mesomorphic grasses and shrubs, with or without scattered trees (and trees typically <10% cover), ranging from temperate coastal to inland lowland and montane grasslands and shrublands, with a strongly seasonal climate and at least some frost to extended cold seasons.

2.B.2. Temperate Grassland & Shrubland usnvc.org

Temperate Grassland, Meadow & Shrubland is dominated by perennial grasses, forbs and shrubs typical of moderately dry to moist habitats and is found in the mid-latitude regions of all continents (23° to 55°N and S), varying from large open grassland landscapes to droughty hillside meadows in forested landscapes.

D023. Central North American Grassland & Shrubland usnvc.org

This division is found in the central plains of North America, and is dominated by grassland vegetation commonly referred to as shortgrass, mixedgrass and tallgrass prairie, interspersed with evergreen and deciduous shrublands. The vegetation occurs on either glaciated or non-glaciated substrates, rolling to rugged topography, and fine-textured to coarse-textured soils, and natural disturbances include grazing and fire.

M054. **Central Lowlands Tallgrass Prairie** usnvc.org

This Great Plains tallgrass prairie macrogroup is dominated by a suite of tall and mid-height grasses and forbs, including the grasses *Andropogon gerardii, Panicum virgatum, Schizachyrium scoparium, Sorghastrum nutans, Sporobolus heterolepis*, and *Tripsacum dactyloides*. It is found over a range of moisture conditions on glaciated and unglaciated soils from Texas to Manitoba. Because of the relatively moist climate, the type is dependent on fire for maintenance of species richness and suppression of woody plant encroachment.

G333. **Central Tallgrass Prairie** usnvc.org

Central Tallgrass Prairie

Big Bluestem - Indiangrass - Porcupine Grass Tallgrass Prairie Group

This group is found in the midwestern United States as tallgrass prairies, typically with abundant *Andropogon gerardii*, *Panicum virgatum*, and *Sorghastrum nutans*, and a variety of midgrasses and forbs on deep, rich soils.

IA, IL, IN, KS, MI, MN, MO, NE, OH, ON, SD, WI

A4047. **Central Dry Sand & Gravel Tallgrass Prairie** usnvc.org

Schizachyrium scoparium - Sorghastrum nutans Central Sand & Gravel Grassland Alliance

Little Bluestem - Indiangrass Central Sand & Gravel Grassland Alliance

This alliance is found in the central United States and southern Canada on shallow to deep, well-drained to excessively well-drained soils and contains moderate to dense cover of medium and tall grasses and a diverse mixture of forbs.

AR, IA, IL, IN, MI, MN, MO, NE, OH, ON, WI

CEGL002035. **Loess Hills Little Bluestem Dry Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula - Bouteloua hirsuta - (Yucca glauca) Grassland

Little Bluestem - Sideoats Grama - Hairy Grama - (Soapweed Yucca) Grassland

IA, MO, NE

M051. **Great Plains Mixedgrass & Fescue Prairie** usnvc.org

The macrogroup is dominated by mixed grasses and scattered to moderately dense shrubs. It is found from northern Texas to southern Alberta across to southwest in the region between the tallgrass prairies to the east and the shortgrass prairies to the west. It occurs on both glaciated and non-glaciated substrates on a wide variety of landforms, and natural disturbances include grazing and fire.

G133. **Central Great Plains Mixedgrass Prairie** usnvc.org

Central Great Plains Mixedgrass Prairie

Little Bluestem - Sideoats Grama - Western Wheatgrass Mixedgrass Prairie Group

This group occurs in the central Great Plains where grasslands are dominated by *Bouteloua curtipendula, Pascopyrum smithii*, and *Schizachyrium scoparium*, often with tallgrass or shortgrass species present to codominant.

CO, KS, MXCOA?, NE, NM, OK, TX

A4039. **Great Plains Western Wheatgrass - Blue Grama Grassland** usnvc.org

Pascopyrum smithii - Bouteloua gracilis Great Plains Grassland Alliance

Western Wheatgrass - Blue Grama Great Plains Grassland Alliance

This alliance is found in the southwestern Great Plains and into western New Mexico where *Pascopyrum smithii* and *Bouteloua gracilis* dominate in swales and valleys.

CO, KS, NM, OK, TX

CEGL001578. **Western Wheatgrass - Blue Grama Mixedgrass Prairie** usnvc.org

Pascopyrum smithii - Bouteloua gracilis Grassland

Western Wheatgrass - Blue Grama Grassland

CO, KS, NM, OK, TX

CEGL001702. **Colorado Front Range Needle-and-Thread Mixedgrass Prairie** usnvc.org

Hesperostipa comata Colorado Front Range Grassland

Needle-and-Thread Colorado Front Range Grassland

CO

A4040. **Seep Muhly Grassland** usnvc.org

Muhlenbergia reverchonii Grassland Alliance

Seep Muhly Grassland Alliance

This alliance consists of grasslands of limestone slopes and associated seeps of the Edwards Plateau and central Oklahoma where *Muhlenbergia reverchonii* is dominant or codominant.

OK, TX

CEGL004219. **Seep Muhly - Sideoats Grama - Velvet Bundleflower Grassland** usnvc.org

Muhlenbergia reverchonii - Bouteloua curtipendula - Desmanthus velutinus Grassland

Seep Muhly - Sideoats Grama - Velvet Bundleflower Grassland

TX

CEGL004520. **Seep Muhly - Tall Grama - Little-tooth Sedge Grassland** usnvc.org

Muhlenbergia reverchonii - Bouteloua hirsuta var. pectinata - Carex microdonta Grassland

Seep Muhly - Tall Grama - Little-tooth Sedge Grassland

TX

CEGL004785. **Seep Muhly Grassland** usnvc.org

Muhlenbergia reverchonii - Croton monanthogynus Grassland

Seep Muhly - Prairie-tea Grassland

OK, TX

A4042. **Central Great Plains Little Bluestem - Sideoats Grama Grassland** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula Central Plains Grassland Alliance

Little Bluestem - Sideoats Grama Central Plains Grassland Alliance

This alliance is common in the central and southern Great Plains on slopes and rolling uplands where *Schizachyrium scoparium* and *Bouteloua curtipendula* are dominant or codominant, possibly with a variety of other short, mid, and tallgrass species.

CO, KS, MXCOA?, NE, NM, OK, TX

CEGL001594. **Western Great Plains Little Bluestem Mixedgrass Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula Western Great Plains Grassland

Little Bluestem - Sideoats Grama Western Great Plains Grassland

CO, KS, NM?, OK, TX

CEGL002036. **Little Bluestem Loess Mixedgrass Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula Loess Mixedgrass Grassland

Little Bluestem - Sideoats Grama Loess Mixedgrass Grassland

CO, KS, NE, SD

CEGL002246. **Central Great Plains Little Bluestem Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula - Bouteloua gracilis Central Plains Grassland

Little Bluestem - Sideoats Grama - Blue Grama Central Plains Grassland

KS, OK

CEGL002247. **Little Bluestem Chalkflat Mixedgrass Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula Chalkflat Grassland

Little Bluestem - Sideoats Grama Chalkflat Grassland

KS, OK?

CEGL002248. **Red Hills Little Bluestem Mixedgrass Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula Red Hills Grassland

Little Bluestem - Sideoats Grama Red Hills Grassland

KS, OK

CEGL002252. **Western Gypsum and Redbed Clay Prairie** usnvc.org

Schizachyrium scoparium - Lesquerella gordonii - Castilleja purpurea var. citrina Grassland

Little Bluestem - Gordon's Bladderpod - Prairie Indian-paintbrush Grassland

OK, TX?

CEGL004066. **Southern Great Plains Mixedgrass Prairie** usnvc.org

Juniperus virginiana / Schizachyrium scoparium - Bouteloua curtipendula Great Plains Grassland

Eastern Red-cedar / Little Bluestem - Sideoats Grama Great Plains Grassland

KS?, OK

CEGL004070. **Little Bluestem - Sideoats Grama - Texas Wintergrass Grassland** usnvc.org

Schizachyrium scoparium - Bouteloua curtipendula - Nassella leucotricha Grassland

Little Bluestem - Sideoats Grama - Texas Wintergrass Grassland

TX

CEGL005031. **Gypsum Outcrop Grassland** usnvc.org

Sporobolus cryptandrus - Schizachyrium scoparium - Bouteloua curtipendula Grassland

Sand Dropseed - Little Bluestem - Sideoats Grama Grassland

TX

CEGL008296. **Central Plains Needle-and-Thread - Blue Grama Grassland** usnvc.org

Hesperostipa comata - Bouteloua gracilis Central Grassland

Needle-and-Thread - Blue Grama Central Grassland

KS, NE

A4677. **West-Central Plains Big Bluestem Grassland** usnvc.org

Andropogon gerardii Central Mixedgrass Grassland Alliance

Big Bluestem Central Mixedgrass Grassland Alliance

This alliance contains moist to bottomland stands in the central Great Plains that are dominated by *Andropogon gerardii* and several other tall grasses.

CO, KS, NE, OK, TX

CEGL001464. **West-Central Plains Big Bluestem - Indiangrass Prairie** usnvc.org

Andropogon gerardii - Sorghastrum nutans West-Central Plains Grassland

Big Bluestem - Indiangrass West-Central Plains Grassland

CO, KS, NE, OK, TX

CEGL001465. **Western Foothills Big Bluestem - Prairie Dropseed Prairie** usnvc.org

Andropogon gerardii - Sporobolus heterolepis Western Foothills Grassland

Big Bluestem - Prairie Dropseed Western Foothills Grassland

CO, OK?

G331. **Northern Great Plains Dry Mixedgrass Prairie** usnvc.org

Northern Great Plains Dry Mixedgrass Prairie

Needle-and-Thread - Blue Grama Dry Mixedgrass Prairie Group

This group occurs largely in the northern Great Plains It is found on a variety of dry to dry-mesic upland settings where midgrasses, especially *Elymus lanceolatus, Hesperostipa comata, Hesperostipa curtiseta*, and *Pseudoroegneria spicata*, are mixed with shortgrasses and sedges, including *Bouteloua gracilis, Carex filifolia, Carex inops ssp. heliophila*, and *Koeleria macrantha*.

AB, MT, ND, SK, WY

A4029. **Needle-and-Thread - Wheatgrass Dry Grassland** usnvc.org

Hesperostipa curtiseta - Elymus lanceolatus Grassland Alliance

Short-bristle Needle-and-Thread - Thick-spike Wheatgrass Grassland Alliance

This mixedgrass alliance is found in the northwestern Great Plains, both in prairie provinces of Canada and adjacent United States. *Hesperostipa curtiseta* and *Elymus lanceolatus* are dominant, possibly in combination with other northern midgrasses such as *Pascopyrum smithii* and *Koeleria macrantha*.

AB?, MB, MT, ND, SK

CEGL002253.	**Short-bristle Needle-and-Thread - Thick-spike Wheatgrass Mixedgrass Prairie** *Hesperostipa curtiseta - Elymus lanceolatus* Grassland Short-bristle Needle-and-Thread - Thick-spike Wheatgrass Grassland MT, ND, SK	usnvc.org
CEGL003789.	**Short-bristle Needle-and-Thread - Western Wheatgrass Grassland** *Hesperostipa curtiseta - Pascopyrum smithii* Grassland Short-bristle Needle-and-Thread - Western Wheatgrass Grassland AB?, MT, ND?, SK?	usnvc.org
A4032.	**Northwestern Great Plains Bluebunch Wheatgrass - Western Wheatgrass Grassland** *Pseudoroegneria spicata - Pascopyrum smithii - Hesperostipa comata* Grassland Alliance Bluebunch Wheatgrass - Western Wheatgrass - Needle-and-Thread Grassland Alliance This alliance is found in the northwestern Great Plains on shallow, rocky soils where *Pseudoroegneria spicata* is consistently abundant to dominant. MT, ND, WY	usnvc.org
CEGL001663.	**Bluebunch Wheatgrass - Sideoats Grama Mixedgrass Prairie** *Pseudoroegneria spicata - Bouteloua curtipendula* Grassland Bluebunch Wheatgrass - Sideoats Grama Grassland MT, ND, WY?	usnvc.org
CEGL001664.	**Bluebunch Wheatgrass - Blue Grama Mixedgrass Prairie** *Pseudoroegneria spicata - Bouteloua gracilis* Grassland Bluebunch Wheatgrass - Blue Grama Grassland CO, MT, WY?	usnvc.org
CEGL001675.	**Bluebunch Wheatgrass - Western Wheatgrass Mixedgrass Prairie** *Pseudoroegneria spicata - Pascopyrum smithii* Grassland Bluebunch Wheatgrass - Western Wheatgrass Grassland MT, ND?, WY	usnvc.org
A4381.	**Northwestern Great Plains Dry Mixedgrass Shrubland Alliance** *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance This dwarf shrub alliance occurs in the dry Northwestern Great Plains, dominated by *Atriplex gardneri* and *Artemisia tridentata* with mixedgrass prairie associates. MT, ND, SD, WY	usnvc.org
CEGL000993.	**Big Sagebrush - Shadscale Saltbush Shrubland**	usnvc.org

Artemisia tridentata - Atriplex confertifolia Shrubland

Big Sagebrush - Shadscale Saltbush Shrubland

MT, ND

CEGL001330. **Rubber Rabbitbrush / Bluebunch Wheatgrass Shrubland** usnvc.org

Ericameria nauseosa / Pseudoroegneria spicata Shrubland

Rubber Rabbitbrush / Bluebunch Wheatgrass Shrubland

MT, ND, SD, WY?

CEGL001440. **Gardner's Saltbush / Big Sagebrush Dwarf-shrubland** usnvc.org

Atriplex gardneri / Artemisia tridentata Dwarf-shrubland

Gardner's Saltbush / Big Sagebrush Dwarf-shrubland

MT

CEGL001443. **Great Plains Badlands Gardner's Saltbush** usnvc.org

Atriplex gardneri / Monolepis nuttalliana Dwarf-shrubland

Gardner's Saltbush / Nuttall's Povertyweed Dwarf-shrubland

MT, WY?

CEGL001445. **Gardner's Saltbush / Western Wheatgrass Dwarf-shrubland** usnvc.org

Atriplex gardneri / Pascopyrum smithii Dwarf-shrubland

Gardner's Saltbush / Western Wheatgrass Dwarf-shrubland

MT, SD, WY

CEGL001451. **Birdfoot Sagebrush / Western Wheatgrass Shrubland** usnvc.org

Artemisia pedatifida / Pascopyrum smithii Shrubland

Birdfoot Sagebrush / Western Wheatgrass Shrubland

WY

CEGL008294. **Wyoming Big Sagebrush / Blue Grama Great Basin Shrubland** usnvc.org

Artemisia tridentata ssp. wyomingensis / *Bouteloua gracilis* Great Basin Shrubland

Wyoming Big Sagebrush / Blue Grama Great Basin Shrubland

MT, ND, WY

CEGL008295. **Wyoming Big Sagebrush / Blue Grama Northwestern Plains Shrubland** usnvc.org

Artemisia tridentata ssp. wyomingensis / *Bouteloua gracilis* Northwestern Plains Shrubland

Wyoming Big Sagebrush / Blue Grama Northwestern Plains Shrubland

MT, ND, SD, WY

CEGL008298. **Northwestern Great Plains Rabbitbrush Dwarf-Shrubland** usnvc.org

Krascheninnikovia lanata / *Hesperostipa comata* Great Plains Dwarf-shrubland

MT, SK?

CEGL008299. **Northwestern Plains Big Sagebrush / Western Wheatgrass Shrub Grassland** usnvc.org

Artemisia tridentata ssp. *wyomingensis* / *Pascopyrum smithii - Pseudoroegneria spicata* Shrub Grassland

MT, ND

A4389. **Needle-and-Thread Northern Dry Grassland** usnvc.org

Hesperostipa comata Northern Dry Grassland Alliance

Needle-and-Thread Northern Dry Grassland Alliance

This widespread alliance is found in the northwestern Great Plains. *Hesperostipa comata* is a common dominant, with codominants of *Bouteloua gracilis*, *Carex filifolia*, and *Carex inops ssp. Heliophile.* Sites are on flat to rolling uplands or hillsides with medium-textures.

AB, CO, KS, MT, ND, NE, SD, WY

CEGL001610. **Idaho Fescue - Sedge Mixedgrass Prairie** usnvc.org

Festuca idahoensis - Carex inops ssp. heliophila Grassland

Idaho Fescue - Sun Sedge Grassland

MT

CEGL001700. **Needle-and-Thread - Threadleaf Sedge Grassland** usnvc.org

Hesperostipa comata - Carex filifolia Grassland

Needle-and-Thread - Threadleaf Sedge Grassland

MT

CEGL001701. **Needle-and-Thread - Sedge Mixedgrass Prairie** usnvc.org

Hesperostipa comata - Carex inops ssp. heliophila Grassland

Needle-and-Thread - Sun Sedge Grassland

MT, WY

CEGL002037. **Needle-and-Thread - Blue Grama Mixedgrass Prairie** usnvc.org

Hesperostipa comata - Bouteloua gracilis - Carex filifolia Grassland

Needle-and-Thread - Blue Grama - Threadleaf Sedge Grassland

AB, CO, KS, MB, MT, ND, NE, SD, SK, WY

CEGL008297. **Northern Plains Needle-and-Thread - Blue Grama Prairie** usnvc.org

Hesperostipa comata - Bouteloua gracilis - Carex filifolia Northern Grassland

Needle-and-Thread - Blue Grama - Threadleaf Sedge Northern Grassland

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G141. **Northern Great Plains Mesic Mixedgrass Prairie** usnvc.org

Northern Great Plains Mesic Mixedgrass Prairie

Western Wheatgrass - Needle-and-Thread - Little Bluestem Mixedgrass Prairie Group

This group is widespread in the northern Great Plains and has scattered occurrences in the western Great Plains; sites are dominated by a mixture of short, medium, and tall grasses, including *Andropogon gerardii*, *Carex inops ssp. heliophila*, *Carex filifolia*, *Nassella viridula*, *Panicum virgatum*, *Pascopyrum smithii*, *Schizachyrium scoparium*, and *Sorghastrum nutans*.

AB, MB, MT, ND, NE, SD, SK, WY

A4031. **Northwestern Great Plains Mesic Western Wheatgrass Grassland** usnvc.org

Pascopyrum smithii - *Nassella viridula* Northwestern Great Plains Grassland Alliance

Western Wheatgrass - Green Needlegrass Northwestern Great Plains Grassland Alliance

This alliance is found in the northern Great Plains on fine-textured soils in mesic settings where the midgrasses *Pascopyrum smithii* and *Nassella viridula* are dominant or codominant.

AB, MB, MT, ND, NE, SD, SK, WY

CEGL001579. **Western Wheatgrass - Blue Grama - Threadleaf Sedge Prairie** usnvc.org

Pascopyrum smithii - *Bouteloua gracilis* - *Carex filifolia* Grassland

Western Wheatgrass - Blue Grama - Threadleaf Sedge Grassland

AB, CO, MT, ND, NE, SD, SK, WY

CEGL001583. **Western Wheatgrass - Green Needlegrass Mixedgrass Prairie** usnvc.org

Pascopyrum smithii - *Nassella viridula* Grassland

Western Wheatgrass - Green Needlegrass Grassland

CO, MT, ND, NE, SD, SK?, WY

CEGL001713. **Green Needlegrass Grassland** usnvc.org

Nassella viridula Grassland

Green Needlegrass Grassland

CO

CEGL002034. **Central Wheatgrass - Needle-and-Thread Mixedgrass Prairie** usnvc.org

Pascopyrum smithii - *Hesperostipa comata* Central Mixedgrass Grassland

Western Wheatgrass - Needle-and-Thread Central Mixedgrass Grassland

MB, MT, ND, NE, SD, SK

CEGL002270. **Northern Plains Blue Grama - Buffalograss Prairie** usnvc.org

Bouteloua gracilis - *Bouteloua dactyloides* Northern Plains Grassland

Blue Grama - Buffalograss Northern Plains Grassland

ND, NE, SD, SK

A4034. **Northwestern Plains Little Bluestem Grassland** usnvc.org

Schizachyrium scoparium Northern Mixedgrass Grassland Alliance

Little Bluestem Northern Mixedgrass Grassland Alliance

This alliance is found in the northwestern Great Plains mixedgrass region on coarse- or medium-textured soils. *Schizachyrium scoparium* is the dominant grass but other mid and short grasses and sedges can be abundant, particularly *Bouteloua curtipendula, Bouteloua gracilis, Carex inops ssp. heliophila*, and *Carex filifolia*.

MB, MT, ND, NE, SD, SK, WY

CEGL001681. **Northern Great Plains Little Bluestem Prairie** usnvc.org

Schizachyrium scoparium - Bouteloua (curtipendula, gracilis) - Carex filifolia Grassland

Little Bluestem - (Sideoats Grama, Blue Grama) - Threadleaf Sedge Grassland

MB, MT, ND, NE, SD, SK, WY

CEGL001682. **Northern Plains Little Bluestem - Sedge Prairie** usnvc.org

Schizachyrium scoparium - Carex inops ssp. heliophila Grassland

Little Bluestem - Sun Sedge Grassland

MT

CEGL001683. **Northern Plains Little Bluestem - Muhly Prairie** usnvc.org

Schizachyrium scoparium - Muhlenbergia cuspidata Grassland

Little Bluestem - Plains Muhly Grassland

MT, ND, SK?

A4382. **Northern Plains Big Bluestem Grassland** usnvc.org

Andropogon gerardii - Sorghastrum nutans Northern Mixedgrass Grassland Alliance

Big Bluestem - Indiangrass Northern Mixedgrass Grassland Alliance

This alliance contains moist to bottomland stands in the northern Great Plains that are dominated by *Andropogon gerardii, Sorghastrum nutans*, and several other tall grasses.

MT, ND, SD, WY

CEGL001463. **Northwestern Plains Bluestem Prairie** usnvc.org

Andropogon gerardii - Schizachyrium scoparium Northwestern Plains Grassland

Big Bluestem - Little Bluestem Northwestern Plains Grassland

CO, MT, ND?, SD, WY

CEGL002023. **Sandhills Wet-Mesic Prairie** usnvc.org

Andropogon gerardii - Panicum virgatum Sandhills Grassland

Big Bluestem - Switchgrass Sandhills Grassland

ND?, NE, SD

CEGL002205. **Northern Plains Big Bluestem Prairie** usnvc.org

Andropogon gerardii - Schizachyrium scoparium Northern Plains Grassland

Big Bluestem - Little Bluestem Northern Plains Grassland

MT, ND, SD, SK?, WY

CEGL002376. **North-Central Plains Bluestem Prairie** usnvc.org

Andropogon gerardii - Sporobolus heterolepis - Schizachyrium scoparium - Pascopyrum smithii Grassland

Big Bluestem - Prairie Dropseed - Little Bluestem - Western Wheatgrass Grassland

MB, ND, SD, SK

A4383. **Northern Plains Low Shrubland** usnvc.org

Juniperus horizontalis - Rhus trilobata - Dasiphora fruticosa Shrubland Alliance

Creeping Juniper - Skunkbush Sumac - Shrubby-cinquefoil Shrubland Alliance

This low shrubland type occurs in local areas of the mesic mixedgrass prairie region of the northern Plains, from western Manitoba and the Dakotas to eastern Montana and Wyoming

MB, MT, ND, SD, WY

CEGL001393. **Creeping Juniper / Sedge Dwarf-shrubland** usnvc.org

Juniperus horizontalis / Carex inops ssp. heliophila Dwarf-shrubland

Creeping Juniper / Sun Sedge Dwarf-shrubland

MT, ND, SD

CEGL001394. **Creeping Juniper / Little Bluestem Dwarf-shrubland** usnvc.org

Juniperus horizontalis / Schizachyrium scoparium Dwarf-shrubland

Creeping Juniper / Little Bluestem Dwarf-shrubland

MB, MT, ND, SD

CEGL001504. **Skunkbush / Threadleaf Sedge Shrub Prairie** usnvc.org

Rhus trilobata / Carex filifolia Shrub Grassland

Skunkbush Sumac / Threadleaf Sedge Shrub Grassland

MT, ND, NE, SD

CEGL001506. **Skunkbush Sumac / Little Bluestem Shrub Prairie** usnvc.org

Rhus trilobata / Schizachyrium scoparium Shrub Grassland

Skunkbush Sumac / Little Bluestem Shrub Grassland

MT

CEGL002198. **Shrubby-cinquefoil / Little Bluestem Shrub Prairie** usnvc.org

Dasiphora fruticosa / Schizachyrium scoparium Shrub Grassland

Shrubby-cinquefoil / Little Bluestem Shrub Grassland

ND

A4384.	**Northern Plains Mesic Tall Shrubland** *Prunus virginiana - Symphoricarpos occidentalis - Amelanchier alnifolia* Northern Plains Shrubland Alliance Chokecherry - Western Snowberry - Saskatoon Serviceberry Northern Plains Shrubland Alliance This mesic tall shrubland type is found in the Northern Great Plains. Typical dominants include *Amelanchier alnifolia*, *Prunus virginiana*, *as well as Crataegus* spp and *Viburnum lentago*. MT, NE, SD, SK?, WY	usnvc.org
CEGL001093.	**Western Great Plains Wooded Draw and Ravine** *Crataegus douglasii - (Crataegus chrysocarpa)* Shrubland Black Hawthorn - (Fireberry Hawthorn) Shrubland MT, SD, WY	usnvc.org
CEGL001097.	**Fleshy Hawthorn Shrubland** *Crataegus succulenta* Shrubland Fleshy Hawthorn Shrubland MT, WY	usnvc.org
CEGL001131.	**Northern Plains Snowberry Shrubland** *Symphoricarpos occidentalis* Shrubland Western Snowberry Shrubland AB, CO, MB, MT, ND, NE, SD, SK, WY?	usnvc.org
CEGL002183.	**Saskatoon Serviceberry Shrubland** *Amelanchier alnifolia* Shrubland Saskatoon Serviceberry Shrubland ND, SK	usnvc.org
CEGL005453.	**Northern Plains Chokecherry Shrubland** *Prunus virginiana* Northern Plains Shrubland Chokecherry Northern Plains Shrubland CO, MT, NE, SD, WY	usnvc.org

G332.	**Northern Great Plains Rough Fescue Prairie** Northern Great Plains Rough Fescue Prairie Plains Rough Fescue - Needle-and-Thread species Grassland Group This group occurs in the northern Great Plains of Canada and the far northern United States on upland sites dominated by *Festuca hallii*, often with *Hesperostipa curtiseta*, *Hesperostipa comata*, *Avenula hookeri*, and *Koeleria macrantha*.	usnvc.org

AB, MB, MT, ND, SK

A4043. **Northern Plains Altai Fescue Grassland** usnvc.org

Festuca altaica Northern Great Plains Grassland Alliance

Altai Fescue Northern Great Plains Grassland Alliance

This alliance is found in the northern Great Plains, largely in southern Canada, on dry-mesic sites dominated or codominated by *Festuca altaica*.

MB, MT, ND, ON, SK

CEGL002436. **Northern Plains Needlegrass - Altai Fescue Grassland** usnvc.org

Festuca altaica - (Hesperostipa spp., *Achnatherum* spp.) Grassland

Altai Fescue - (Needle-and-Thread species, Ricegrass species) Grassland

MB, ND, ON, SK

M053. Western Great Plains Shortgrass Prairie usnvc.org

This macrogroup is composed of the matrix short grasslands in the western Great Plains, from southeastern Wyoming to the Texas panhandle, and is characterized the dominance of short grasses *Bouteloua gracilis* and *Bouteloua dactyloides.*

G144. Great Plains Shortgrass Prairie usnvc.org

Great Plains Shortgrass Prairie

Blue Grama - Buffalograss - James' Galleta Shortgrass Prairie Group

This semi-arid shortgrass grassland group occurs in the western half of the Western Great Plains and is usually composed of *Bouteloua gracilis* as the dominant or codominant species with associated graminoids *Aristida purpurea, Bouteloua curtipendula, Bouteloua hirsuta, Bouteloua dactyloides, Hesperostipa comata, Hesperostipa neomexicana, Pascopyrum smithii, Pleuraphis jamesii, Sporobolus cryptandrus*, and scattered shrubs, dwarf-shrubs and cacti.

AZ, CO, KS, NE, NM, OK, TX, WY

A4000. **Blue Grama - Buffalograss Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua dactyloides Shortgrass Prairie Alliance

Blue Grama - Buffalograss Shortgrass Prairie Alliance

This shortgrass alliance is characterized by a moderate to dense sod of short grasses *Bouteloua gracilis* and *Bouteloua dactyloides* on semi-arid prairies and is common across the southwestern portions of the Great Plains.

CO, KS, NE, NM, OK, TX, WY?

CEGL001756. **Blue Grama - Buffalograss Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua dactyloides Grassland

Blue Grama - Buffalograss Grassland

CO, KS, NE, NM, OK, TX, WY?

CEGL002271. **Blue Grama - Galleta Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua dactyloides - Pleuraphis jamesii Grassland

Blue Grama - Buffalograss - James' Galleta Grassland

NM, OK, TX

CEGL008293. **Winterfat Great Plains Dwarf-shrub Grassland** usnvc.org

Krascheninnikovia lanata / *Bouteloua gracilis* Great Plains Dwarf-shrub Grassland

Winterfat / Blue Grama Great Plains Dwarf-shrub Grassland

OK

A4001. **Great Plains Grama Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua hirsuta - Bouteloua curtipendula Shortgrass Prairie Alliance

Blue Grama - Hairy Grama - Sideoats Grama Shortgrass Prairie Alliance

This shortgrass prairie alliance is characterized by a moderate to dense layer of short grasses dominated by *Bouteloua gracilis*, *Bouteloua hirsuta*, and midgrass *Bouteloua curtipendula* with *Bouteloua dactyloides* absent or has low cover. It is common across the western portions of the central and southern Great Plains.

CO, KS, NM, OK, TX, WY

CEGL001754. **Blue Grama - Sideoats Grama Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua curtipendula Grassland

Blue Grama - Sideoats Grama Grassland

CO, NM, OK, TX?

CEGL001755. **Blue Grama - Hairy Grama Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Bouteloua hirsuta Grassland

Blue Grama - Hairy Grama Grassland

CO, NM, OK, TX?

CEGL001761. **Blue Grama - Sand Dropseed Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Sporobolus cryptandrus Grassland

Blue Grama - Sand Dropseed Grassland

NM

CEGL001764. **Hairy Grama - Sideoats Grama Shortgrass Prairie** usnvc.org

Bouteloua hirsuta - Bouteloua curtipendula Grassland

Hairy Grama - Sideoats Grama Grassland

NM, OK, TX

CEGL002250. **Grama Mixedgrass Prairie** usnvc.org

Bouteloua curtipendula - Bouteloua (eriopoda, gracilis) Grassland

Sideoats Grama - (Black Grama, Blue Grama) Grassland

NM?, OK, TX

CEGL002673.	**Hairy Grama Grassland** *Bouteloua hirsuta* Grassland [Placeholder] Hairy Grama Grassland AZ, CO	usnvc.org
CEGL002782.	**Prairie Sagewort / Blue Grama Dwarf-shrubland** *Artemisia frigida / Bouteloua gracilis* Dwarf-shrubland Prairie Sagewort / Blue Grama Dwarf-shrubland CO, NM	usnvc.org
CEGL005011.	**Snakeweed - Yucca Dwarf-shrubland** *Gutierrezia sarothrae - Yucca glauca* Dwarf-shrubland Broom Snakeweed - Soapweed Yucca Dwarf-shrubland OK, TX	usnvc.org
CEGL005389.	**Blue Grama - Ring Muhly - Purple Three-awn Shortgrass Prairie** *Bouteloua gracilis - Muhlenbergia torreyi - Aristida purpurea* Grassland Blue Grama - Ring Muhly - Purple Three-awn Grassland CO, NM	usnvc.org
A4002.	**Blue Grama - Hairy Grama - New Mexico Feathergrass Shortgrass Prairie** *Bouteloua gracilis - Bouteloua hirsuta - Hesperostipa neomexicana* Shortgrass Prairie Alliance Blue Grama - Hairy Grama - New Mexico Feathergrass Shortgrass Prairie Alliance This mixedgrass alliance is characterized by a moderately dense grass layer of midgrass *Hesperostipa neomexicana* with a shortgrass layer composed of codominant *Bouteloua gracilis* and/or *Bouteloua hirsuta*. It is found from the northern Chihuahuan Desert north into the southwestern Great Plains on gentle to moderately steep slopes in foothills and escarpments. CO, NM, OK, TX	usnvc.org
CEGL001708.	**New Mexico Feathergrass Mixedgrass Prairie** *Hesperostipa neomexicana* Grassland New Mexico Feathergrass Grassland CO	usnvc.org
CEGL001711.	**New Mexico Feathergrass Mixed Prairie Grassland** *Hesperostipa neomexicana* Mixed Prairie Grassland New Mexico Feathergrass Mixed Prairie Grassland NM	usnvc.org

CEGL001763. **Blue Grama - New Mexico Feathergrass Shortgrass Prairie** usnvc.org

Bouteloua gracilis - Hesperostipa neomexicana Grassland

Blue Grama - New Mexico Feathergrass Grassland

NM, OK, TX

CEGL001766. **Hairy Grama - New Mexico Feathergrass Shortgrass Prairie** usnvc.org

Bouteloua hirsuta - Hesperostipa neomexicana Grassland

Hairy Grama - New Mexico Feathergrass Grassland

NM

M052. Great Plains Sand Grassland & Shrubland usnvc.org

This Great Plains macrogroup is found from Texas to southern Canada on somewhat excessively to excessively well-drained, deep sandy to loamy sand soils and contains grasses and scattered to moderately dense shrubs well-adapted to these soil conditions. Wind erosion, grazing and fire can significantly impact this macrogroup.

G888. Southern Great Plains Sand Grassland & Shrubland usnvc.org

Southern Great Plains Sand Grassland & Shrubland

Southern Great Plains Sand Grassland & Shrubland Group

A0816. Great Plains Sand Sagebrush Sand Prairie Scrub usnvc.org

Artemisia filifolia Great Plains Sand Prairie Scrub Alliance

Sand Sagebrush Great Plains Sand Prairie Scrub Alliance

This alliance includes *Artemisia filifolia*-dominated shrublands occurring mostly in the central and southern Great Plains from Nebraska and Colorado, south to the Trans-Pecos of western Texas and northern Chihuahuan Desert, extending northwest into the Colorado Plateau. These shrublands typically occur on flat, hummocky, or rolling terrain, as well as on partially stabilized dunes and sandsheets. Vegetation cover is sparse to moderately dense, with a shrub stratum approximately 1 m tall, dominated by *Artemisia filifolia*, interspersed with areas of bare substrate and scattered tall or midgrasses.

CO, KS, NE, NM, OK, TX, WY?

CEGL001459. **Sand Sagebrush / Sand Bluestem Shrubland** usnvc.org

Artemisia filifolia / Andropogon hallii Shrubland

Sand Sagebrush / Sand Bluestem Shrubland

CO, KS, NE, NM?, OK, TX, WY?

CEGL002176. **Sand Sagebrush / Grama Shrubland** usnvc.org

Artemisia filifolia / Bouteloua (curtipendula, gracilis) Shrubland

Sand Sagebrush / (Sideoats Grama, Blue Grama) Shrubland

CO, KS, NM, OK, TX

CEGL002177. **Badlands Sand Sagebrush - Yucca Shrubland** usnvc.org

Artemisia filifolia - Yucca glauca / Calamovilfa longifolia Shrubland

Sand Sagebrush - Soapweed Yucca / Prairie Sandreed Shrubland

SD

CEGL002178. **Sand Sagebrush / Little Bluestem Shrubland** usnvc.org

Artemisia filifolia / Schizachyrium scoparium - Andropogon hallii Shrubland

Sand Sagebrush / Little Bluestem - Sand Bluestem Shrubland

KS, OK, TX

CEGL002179. **Sand Sagebrush / Sand Dropseed Shrubland** usnvc.org

Artemisia filifolia / Sporobolus cryptandrus Shrubland

Sand Sagebrush / Sand Dropseed Shrubland

NM, OK, TX

CEGL005000. **Sand Sagebrush - Skunkbush Sumac Shrubland** usnvc.org

Artemisia filifolia - Rhus trilobata Shrubland

Sand Sagebrush - Skunkbush Sumac Shrubland

OK, TX

CEGL008290. **Sand Sagebrush / Bluestem Shrubland** usnvc.org

Artemisia filifolia / Schizachyrium scoparium - Andropogon hallii Shrubland

Sand Sagebrush / Little Bluestem - Sand Bluestem Shrubland

CO, KS, NE, NM, OK, TX

A1193. **Southern Plains Sand Bluestem - Giant Sandreed Grassland** usnvc.org

Andropogon hallii- Calamovilfa gigantea Sand Prairie Alliance

Sand Bluestem - Giant Sandreed Sand Prairie Alliance

This alliance includes herbaceous vegetation with *Andropogon hallii*, occurring in the central and southern Great Plains from Nebraska and Colorado south to Texas. It is dominated by sandy tall and midgrass species, with shortgrass species becoming important in the western portion of its range. *Andropogon hallii* is usually dominant or codominant, and *Calamovilfa gigantea* common southward.

CO, KS, NE, OK, TX

CEGL001466. **Sand Bluestem - Sedge Sand Prairie** usnvc.org

Andropogon hallii - Carex inops ssp. heliophila Grassland

Sand Bluestem - Sun Sedge Grassland

CO, MT, ND

CEGL001467. **Sand Bluestem - Prairie Sandreed Sand Prairie** usnvc.org

Andropogon hallii - Calamovilfa longifolia Grassland

Sand Bluestem - Prairie Sandreed Grassland

CO, KS, MB, MT, ND, NE, SD, SK, TX?

CEGL002577.	**Sparse Shortgrass Dune** Shortgrass Dune Sparse Vegetation Shortgrass Dune Sparse Vegetation MB	usnvc.org
CEGL002578.	**Sparse Forb Dune** Forb Dune Sparse Vegetation Forb Dune Sparse Vegetation MB	usnvc.org
CEGL004016.	**Southern Sand Bluestem - Sandreed Prairie** *Andropogon hallii - Calamovilfa gigantea - Calamovilfa longifolia* Grassland Sand Bluestem - Giant Sandreed - Prairie Sandreed Grassland KS, OK, TX	usnvc.org
CEGL004591.	**Sand Bluestem - Havard's Panicgrass - Giant Dropseed Grassland** *Andropogon hallii - Panicum havardii - Sporobolus giganteus* Grassland Sand Bluestem - Havard's Panicgrass - Giant Dropseed Grassland TX	usnvc.org
A4112.	**Southern Plains Havard Oak Prairie Scrub** *Quercus havardii / Schizachyrium scoparium* Prairie Scrub Alliance Havard Oak / Little Bluestem Prairie Scrub Alliance NM, OK, TX	usnvc.org
CEGL002171.	**Havard Oak / Little Bluestem Shrubland** *Quercus havardii / Sporobolus cryptandrus - Schizachyrium scoparium* Shrubland Havard Oak / Sand Dropseed - Little Bluestem Shrubland OK, TX	usnvc.org
CEGL004558.	**Havard Oak / Giant Dropseed Sand Scrub** *Quercus havardii - (Penstemon ambiguus, Croton dioicus) / Sporobolus giganteus* Scrub Havard Oak - (Gilia Beardtongue, Grassland Croton) / Giant Dropseed Scrub NM, TX	usnvc.org
G889.	**Northern Great Plains Sand Grassland & Shrubland** Northern Great Plains Sand Grassland & Shrubland Northern Great Plains Sand Grassland & Shrubland Group	usnvc.org

A1201.	**Northern Plains Prairie Sandreed - Sand Bluestem Prairie** *Calamovilfa longifolia - Andropogon hallii* Sand Prairie Alliance Prairie Sandreed - Sand Bluestem Sand Prairie Alliance This alliance, found in the north Great Plains, occurs on sandy dry-mesic sites. Stands are almost exclusively found on sand deposits; a few are on coarse loams. There are two prominent vegetation layers in stands of this alliance and a moderate amount of bare ground. The tallest layer, about 0.6-1.5 m tall, is dominated by midgrasses, particularly *Calamovilfa longifolia and Andropogon hallii*. AB, MB?, MT, ND, NE, SD, SK, WY	usnvc.org
CEGL001457.	**Skunkbush Sumac / Prairie Sandreed Shrub Prairie** *Rhus trilobata / Calamovilfa longifolia* Shrub Grassland Skunkbush Sumac / Prairie Sandreed Shrub Grassland MT	usnvc.org
CEGL001471.	**Prairie Sandreed - Sedge Prairie** *Calamovilfa longifolia - Carex inops ssp. heliophila* Grassland Prairie Sandreed - Sun Sedge Grassland CO, MT, ND, SD, SK, WY	usnvc.org
CEGL001473.	**Prairie Sandreed - Needle-and-Thread Prairie** *Calamovilfa longifolia - Hesperostipa comata* Grassland Prairie Sandreed - Needle-and-Thread Grassland AB, CO, MT, NE, SD, WY	usnvc.org
CEGL002219.	**Prairie Sandreed - Ricegrass Prairie** *Calamovilfa longifolia - Achnatherum hymenoides* Grassland Prairie Sandreed - Indian Ricegrass Grassland SK	usnvc.org
CEGL008289.	**Sand Bluestem - Prairie Sandreed Sand Prairie** *Andropogon hallii - Calamovilfa longifolia* Grassland Sand Bluestem - Prairie Sandreed Grassland CO, MB, MT, ND, NE, SD, SK	usnvc.org
A1540.	**Great Plains Yucca Sand Prairie Scrub** *Yucca glauca - Calamovilfa longifolia* Sand Prairie Scrub Alliance Soapweed Yucca - Prairie Sandreed Sand Prairie Scrub Alliance This alliance includes stands of herbaceous vegetation with a sparse shrub layer growing on sandstone outcrops and sandy soils in the northwestern Great Plains. Elevations range from 1100-1850 m. Stands of this alliance contain an open to moderately dense (at least 10% cover), low-shrub layer above a species-rich herbaceous layer. Dominance of the shrub layer by *Yucca glauca* is characteristic (cover	usnvc.org

ranging from 5-15%). *Artemisia tridentata ssp. wyomingensis* and *Artemisia cana ssp. cana* may be present but are sparse and contribute little cover.

MT, NE, SD, WY

CEGL001499. **Soapweed Yucca / Bluebunch Wheatgrass Shrub Prairie** usnvc.org

Yucca glauca / Pseudoroegneria spicata Shrub Grassland

Soapweed Yucca / Bluebunch Wheatgrass Shrub Grassland

MT

CEGL002184. **Water Birch - Creeping Juniper / Prairie Sandreed Shrubland** usnvc.org

Betula occidentalis - Juniperus horizontalis / Calamovilfa longifolia Shrubland

Water Birch - Creeping Juniper / Prairie Sandreed Shrubland

MB?, ND

CEGL002675. **Soapweed Yucca / Prairie Sandreed Shrub Prairie** usnvc.org

Yucca glauca / Calamovilfa longifolia Shrub Grassland

Soapweed Yucca / Prairie Sandreed Shrub Grassland

MT, NE, SD, WY

M158. Great Plains Comanchian Scrub & Open Vegetation usnvc.org

This scrub woodland and shrubland vegetation is found in the High, Rolling, and Red Bed plains of Texas and Oklahoma ranging south into parts of the Edwards Plateau and marginally in the Chihuahuan Desert regions of Texas and possibly adjacent Mexico, as well as the Southwestern Tablelands. Occurrences on dry, rocky sites typically include evergreen junipers and oaks such as *Juniperus ashei, Juniperus monosperma, Juniperus pinchotii, Quercus fusiformis, Quercus havardii, Quercus mohriana*, and *Quercus sinuata*, as well as *Prosopis glandulosa var. glandulosa, Buddleja racemosa, Dalea formosa*, and *Mimosa borealis* in some examples.

G598. Comanchian Barrens & Glade usnvc.org

Comanchian Barrens & Glade

Yellow Stonecrop - Gordon's Bladderpod - Poverty Dropseed Glade Vegetation Group

This specialized limestone or granitic glade vegetation is dominated by low forbs, annual grasses, and succulents and is found in inland (non-coastal plain) parts of Texas and adjacent Oklahoma, including the Edwards Plateau, Lampasas Cutplain, Blackland Prairie, Crosstimbers, and isolated locations in the South Texas Plains. Some characteristic plants include *Lesquerella gordonii, Lesquerella ovalifolia, Schizachyrium scoparium, Sedum nuttallianum, Sedum pulchellum*, and *Sporobolus vaginiflorus*.

OK, TX

A3308. Comanchian Open Grassland usnvc.org

Sedum spp. - *Schizachyrium scoparium* Comanchian Open Grassland Alliance

Stonecrop species - Little Bluestem Comanchian Open Grassland Alliance

This alliance accommodates specialized glade vegetation, frequently dominated by low forbs (*Lesquerella gordonii, Lesquerella ovalifolia*), grasses (*Schizachyrium scoparium, Sporobolus vaginiflorus*), succulents (*Sedum nuttallianum, Sedum pulchellum*), and ferns (*Pellaea ternifolia, Selaginella arenicola ssp. riddellii, Selaginella peruviana, Woodsia obtusa ssp. occidentalis*) occurring on a variety of rock outcrops in the inland (non-coastal plain) parts of Texas and adjacent Oklahoma, including the Edwards Plateau, Lampasas Cutplain, Crosstimbers, and Blackland Prairie.

OK, TX

CEGL002238. **Curly-mesquite - Sideoats Grama Mixedgrass Prairie** usnvc.org

Hilaria belangeri - Bouteloua curtipendula Grassland

Curly-mesquite - Sideoats Grama Grassland

MXCOA?, TX

CEGL004396. **Yellow Stonecrop - Peruvian Spikemoss Granitic Outcrop Sparse Vegetation** usnvc.org

Sedum nuttallianum - Selaginella peruviana Granitic Outcrop Sparse Vegetation

Yellow Stonecrop - Peruvian Spikemoss Granitic Outcrop Sparse Vegetation

OK, TX

CEGL004729. **Edwards Plateau Limestone Glade** usnvc.org

Sedum nuttallianum - Sporobolus vaginiflorus (var. ozarkanus, var. vaginiflorus) - Sedum pulchellum Forbland

Yellow Stonecrop - (Ozark Dropseed, Poverty Dropseed) - Widow's-cross Forbland

TX

CEGL004874. **Blackland Prairie Limestone Glade Ephemeral Pool** usnvc.org

Sedum pulchellum - Allium drummondii - Phemeranthus parviflorus - Centaurium texense / Nostoc commune Forbland

Widow's-cross - Drummond's Onion - Sunbright - Lady Bird's Centaury / Common Nostoc Forbland

TX

CEGL004917. **Oklahoma Bladderpod Glade** usnvc.org

Lesquerella (gordonii, ovalifolia) - Schizachyrium scoparium Grassland

(Gordon's Bladderpod, Roundleaf Bladderpod) - Little Bluestem Grassland

OK, TX?

G191. Comanchian Oak - Juniper Scrub usnvc.org

Comanchian Oak - Juniper Scrub

Mohr Oak - Bastard Oak - Pinchot's Juniper Scrub Group

This scrub woodland group occurs on dry, rocky sites on mesas and escarpment breaks in the Rolling Plains, Red Bed Plains, Edwards Plateau and Stockton Plateau regions of the south-central U.S. Characteristic and dominant woody shrubs include *Buddleja racemosa, Juniperus ashei, Juniperus monosperma, Juniperus pinchotii, Quercus mohriana*, and *Quercus sinuata*.

CO, MXCHH?, MXCOA?, NM?, OK, TX

A3246. **Pinchot's Juniper - Mohr Oak Scrub & Woodland** usnvc.org

Juniperus pinchotii - Quercus mohriana Scrub & Woodland Alliance

Pinchot's Juniper - Mohr Oak Scrub & Woodland Alliance

This alliance represents scrub woodlands of the escarpments in the Rolling and Red Bed plains of Texas and Oklahoma (including the Caprock Escarpment in Texas), characterized by scrubby trees of *Juniperus scopulorum*, *Juniperus pinchotii*, and/or *Quercus mohriana* and a variety of other shrubs such as *Rhus trilobata*, *Dalea formosa*, and *Cercocarpus montanus*.

CO, OK, TX

CEGL002173. **Mohr Oak - Pinchot's Juniper Scrub** usnvc.org

Quercus mohriana - Juniperus pinchotii / Bouteloua curtipendula Scrub

Mohr Oak - Pinchot's Juniper / Sideoats Grama Scrub

TX

CEGL003550. **Texas Rocky Mountain Juniper Woodland** usnvc.org

Juniperus scopulorum Woodland

Rocky Mountain Juniper Woodland

CO, TX

A4116. **White Shin Oak Scrub** usnvc.org

Quercus sinuata var. breviloba Scrub Alliance

White Shin Oak Scrub Alliance

OK, TX

CEGL004453. **White Shin Oak Scrub** usnvc.org

Quercus sinuata var. breviloba Scrub

White Shin Oak Scrub

OK, TX

CEGL004531. **Wand Butterfly-bush - Mexican-buckeye / Red Columbine - Virginia Snakeroot Shrubland** usnvc.org

Buddleja racemosa - Ungnadia speciosa / Aquilegia canadensis - Aristolochia serpentaria Shrubland

Wand Butterfly-bush - Mexican-buckeye / Red Columbine - Virginia Snakeroot Shrubland

TX

G192. **Comanchian Mesquite - Mixed Scrub** usnvc.org

Comanchian Mesquite - Mixed Scrub

Honey Mesquite - Lotebush Scrub Group

This Comanchian scrub woodland group is dominated or codominated by *Prosopis glandulosa var. glandulosa*, *Dalea formosa*, and *Mimosa borealis* and is known from the rolling plains of Texas and Oklahoma, the Edwards Plateau as well as the Chihuahuan Desert regions of Texas.

MXCHH?, MXCOA?, NM?, OK, TX

A3247. **Honey Mesquite Scrub Woodland** usnvc.org

Prosopis glandulosa Scrub Woodland Alliance

Honey Mesquite Scrub Woodland Alliance

This scrub woodland alliance ranges from western Oklahoma into western and central Texas and is characterized by a scattered canopy of *Prosopis glandulosa* over native grasses and forbs.

OK, TX

CEGL002133. **Honey Mesquite / Sideoats Grama Woodland** usnvc.org

Prosopis glandulosa / Bouteloua curtipendula - Nassella leucotricha Woodland

Honey Mesquite / Sideoats Grama - Texas Wintergrass Woodland

TX

A4113. Featherplume Dwarf-shrubland usnvc.org

Dalea formosa Dwarf-shrubland Alliance

Featherplume Dwarf-shrubland Alliance

TX

CEGL005009. **Featherplume - Mimosa Dwarf-shrubland** usnvc.org

Dalea formosa - Mimosa borealis Dwarf-shrubland

Featherplume - Fragrant Mimosa Dwarf-shrubland

TX

M498. Great Plains Ruderal Grassland & Shrubland usnvc.org

This macrogroup is found on dry to mesic sites in the central and western Great Plains dominated by exotic herbaceous species or deciduous shrubs.

G680. Great Plains Comanchian Ruderal Grassland & Shrubland usnvc.org

Great Plains Comanchian Ruderal Grassland & Shrubland

Southern Great Plains-Comanchian Ruderal Grassland & Shrubland

This group is dominated by a variety of non-native invasive or native adventive grasses, forbs, or shrubs and is found from Oklahoma though central Texas to western and southern Texas and into Mexico.

MXCOA, MXNLE, MXTAM, NM, OK, TX

A3952. Ruderal Honey Mesquite Scrub usnvc.org

Prosopis glandulosa Ruderal Scrub Alliance

Honey Mesquite Ruderal Scrub Alliance

Vegetation is characterized by an open to dense shrub canopy dominated by *Prosopis glandulosa* with shortgrass species in the understory. This alliance is found primarily in the southern portion of the Western Great Plains Division, primarily in Texas, Oklahoma and eastern New Mexico.

NM, OK, TX

CEGL002194. **Ruderal Honey Mesquite / Sideoats Grama Shrubland** usnvc.org

Prosopis glandulosa / Bouteloua curtipendula Ruderal Shrubland

	Honey Mesquite / Sideoats Grama Ruderal Shrubland OK, TX	
CEGL003877.	**Honey Mesquite / Blue Grama - Buffalograss Ruderal Shrubland** *Prosopis glandulosa var. glandulosa / Bouteloua gracilis - Bouteloua dactyloides* Ruderal Shrubland Honey Mesquite / Blue Grama - Buffalograss Ruderal Shrubland NM?, OK, TX	usnvc.org
A4232.	**Great Plains Comanchian Ruderal Shrubland** Great Plains Comanchian Ruderal Shrubland Alliance Great Plains Comanchian Ruderal Shrubland Alliance OK, TX	usnvc.org
CEGL002180.	**Chickasaw Plum Ruderal Shrubland** *Prunus angustifolia / Schizachyrium scoparium* Ruderal Shrubland Chickasaw Plum / Little Bluestem Ruderal Shrubland OK	usnvc.org
CEGL004212.	**Prairie Sumac - Rooseveltweed Ruderal Shrubland** *Rhus lanceolata - Baccharis neglecta* Ruderal Shrubland Prairie Sumac - Rooseveltweed Ruderal Shrubland TX	usnvc.org
CEGL004947.	**Ruderal Hawthorn Bottomland Shrubland** *Crataegus viridis - Crataegus mollis* Ruderal Shrubland Green Hawthorn - Downy Hawthorn Ruderal Shrubland OK	usnvc.org
A4233.	**Great Plains Comanchian Ruderal Grassland** Great Plains Comanchian Ruderal Grassland Alliance Great Plains Comanchian Ruderal Grassland Alliance MXCOA, MXNLE, MXTAM, OK, TX	usnvc.org
CEGL004915.	**Yellow Bluestem Ruderal Grassland** *Bothriochloa ischaemum var. songarica* Ruderal Grassland Yellow Bluestem Ruderal Grassland MXCOA, MXNLE, MXTAM, OK, TX	usnvc.org
CEGL004925.	**Buffelgrass Ruderal Grassland** *Pennisetum ciliare* Ruderal Grassland	usnvc.org

Buffelgrass Ruderal Grassland

TX

CEGL004948. **Buffalograss Modified Grassland** usnvc.org

Bouteloua dactyloides Modified Grassland

Buffalograss Modified Grassland

OK, TX?

CEGL007791. **Kleberg's Bluestem Ruderal Grassland** usnvc.org

Dichanthium annulatum Ruderal Grassland

Kleberg's Bluestem Ruderal Grassland

TX

CEGL008373. **Brome Grass-Prickly Pear Cactus Mixed Ruderal Grassland** usnvc.org

Bromus spp. - *Amaranthus spp- Opuntia* spp. Mixed Ruderal Grassland

brome spp. - Amaranthus spp- Opuntia spp. Mixed Ruderal Grassland

KS, NE, NM, OK, TX

G679. Northern & Central Great Plains Ruderal Grassland & Shrubland usnvc.org

Northern & Central Great Plains Ruderal Grassland & Shrubland

Kentucky Bluegrass - Timothy - Canada Thistle Northern & Central Plains Ruderal Grassland & Shrubland Group

This group is found in the Great Plains from Nebraska and Colorado north where exotic grasses and forbs constitute >75% of the herbaceous cover and trees and shrubs each have less than 25% cover.

AB, CO, KS?, MB, MT, ND, NE, NM, SD, SK, UT, WY

A4249. Ruderal North-Central Mixed Forbland usnvc.org

Euphorbia esula - Cirsium arvense Mixed Ruderal Forbland Alliance

Leafy Spurge - Canada Thistle Mixed Ruderal Forbland Alliance

AB, MT, ND, SD, SK, WY

CEGL005260. **Great Plains Ruderal Weedy Forbs Meadow** usnvc.org

Cirsium arvense - Weedy Forbs Great Plains Ruderal Forbland

Canada Thistle - Weedy Forbs Great Plains Ruderal Forbland

CO, ND, SD

CEGL005268. **Ruderal Leafy Spurge Meadow** usnvc.org

Euphorbia esula Ruderal Forbland

Leafy Spurge Ruderal Forbland

AB, MT, ND, SD, SK, WY

A4250.	**Western Ruderal Grassland** *Phleum pratense - Poa pratensis - Bromus inermis* Ruderal Grassland Alliance Timothy - Kentucky Bluegrass - Smooth Brome Ruderal Grassland Alliance AB, MT, WY	usnvc.org
CEGL002935.	**Intermediate Wheatgrass Ruderal Grassland** *Thinopyrum intermedium* Ruderal Grassland Intermediate Wheatgrass Ruderal Grassland CO, SD, UT, WA	usnvc.org
CEGL005265.	**Ruderal Kentucky Bluegrass Grassland** *Poa pratensis - (Pascopyrum smithii)* Ruderal Grassland Kentucky Bluegrass - (Western Wheatgrass) Ruderal Grassland CO, MT, ND, NM, SD, UT, WY	usnvc.org
CEGL005874.	**Timothy - Kentucky Bluegrass - Smooth Brome Ruderal Grassland** *Phleum pratense - Poa pratensis - Bromus inermis* Ruderal Grassland Timothy - Kentucky Bluegrass - Smooth Brome Ruderal Grassland AB, MT, NE, SD, WY This alliance is characterized by abundant acidic bedrock outcrops with patchy vegetation with sparsely distributed trees, shrubs, graminoids, and lichens. A northern but subboreal flora consisting of *Pinus banksiana, Pinus strobus, Pinus resinosa, Quercus rubra, Juniperus communis, Sibbaldiopsis tridentata, Danthonia spicata*, and *Poa compressa* is most frequently found in this alliance. MA, MB, ME?, MI, MN, NF, NH?, NY, ON, QC, VT, WI	usnvc.org
CEGL005276.	**Midwestern Oak Quartzite Glade Woodland** *Quercus alba - Carya ovata / Carex pensylvanica - Heuchera richardsonii* Quartzite Glade Woodland White Oak - Shagbark Hickory / Pennsylvania Sedge - Richardson's Alumroot Quartzite Glade Woodland WI	usnvc.org

2.C. Shrub & Herb Wetland

usnvc.org

Shrub & Herb Wetland includes open bogs, fens, fresh and saltwater marshes, wet meadows and wet shrublands. The vegetation occurs from tropical to polar regions.

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

usnvc.org

Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland includes wet riparian and swamp shrublands, wet meadows, wet prairies, and shallow and deep emergent marshes. The vegetation comprises seasonal green emergent, hydrophytic shrubs and herbs with at least 10% cover, on mucky, inundated or saturated soils across the mid-latitudes of the Northern and Southern hemispheres from 23° to 70°.

D031.	**Western North American Temperate Freshwater Marsh, Wet Meadow & Shrubland**	usnvc.org

This division contains 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 latitudes of western North America.

M893. **Western North American Montane Marsh, Wet Meadow & Shrubland** usnvc.org

G526. **Rocky Mountain-Great Basin Lowland-Foothill Riparian Shrubland** usnvc.org

Rocky Mountain-Great Basin Lowland-Foothill Riparian Shrubland

Narrowleaf Willow - Hawthorn species - Stretchberry Rocky Mountain-Great Basin Riparian Shrubland Group

This group consists of riparian shrublands dominated by low to tall shrubs such as *Acer glabrum, Artemisia* spp., *Cornus sericea, Crataegus* spp., *Dasiphora fruticosa ssp. floribunda, Forestiera pubescens, Oplopanax horridus, Philadelphus lewisii, Prunus virginiana, Rhus trilobata, Rosa* spp., *Salix* spp., *Shepherdia argentea*, and *Symphoricarpos* spp. They do not occur up in the mountains, but rather in between mountain valleys and lowlands of the Interior West.

AB, AZ, BC, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY

A3799. **Skunkbush Sumac - River Hawthorn - Stretchberry Shrubland** usnvc.org

Rhus trilobata - Crataegus rivularis - Forestiera pubescens Shrubland Alliance

Skunkbush Sumac - River Hawthorn - Stretchberry Shrubland Alliance

This shrubland alliance is dominated by *Corylus cornuta, Crataegus rivularis, Elaeagnus commutata, Forestiera pubescens, Rhamnus alnifolia, Shepherdia argentea*, and/or *Rhus trilobata*. Usually these are single-species shrublands, but all occupy similar environments. It is an eclectic mix of mesic shrubs that form 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. These are "fringe" riparian shrublands that occur on upper benches and terraces, dry washes and areas near but not necessarily in the wettest part of riparian areas, but receive more moisture than surrounding upland slopes.

AB, AZ, CA, CO, ID, MT, NM, NV, OR, SD, UT, WA, WY

CEGL001108. **Chokecherry - (American Plum) Wet Shrubland** usnvc.org

Prunus virginiana - (Prunus americana) Wet Shrubland

Chokecherry - (American Plum) Wet Shrubland

CO, ID, MT, NM, NV, OR, UT, WA, WY

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APPENDICES

APPENDIX A: CHANGES TO GROUP DESCRIPTIONS

A.1. Central Great Plains Mixedgrass Prairie (G133)

1) Action: Name revised from Great Plains Mixedgrass Prairie to Central Great Plains Mixedgrass Prairie.

Rationale: The initial geographic extent of this group encompassed the *Southern Great Plains Ecoregion* (USEPA 2013). However, workshop participants agreed that in actuality this group does not extend into southeast Wyoming and that Comer et al. (2018) was a more accurate representation of the group extent.

Edits: Annotated geographic extent and removed the states of Iowa, North Dakota, South Dakota, and Wyoming.

2) Action: Review of alliances and associations attributed to the Central Great Plains Mixedgrass Prairie Group.

Rationale: Alliances and associations that were attributed to the Great Plains Mixedgrass Prairie may not fall within the geographic scope of the Central Great Plains Mixedgrass Prairie. For example, Central Great Plains Mixedgrass Prairie has a stronger component of C_4 grasses than the Northern Great Plains Mixedgrass Prairie; therefore, some alliances might be better represented in the latter.

Edits: Schizachyrium *scoparium - Bouteloua curtipendula - Bouteloua hirsuta* - (*Yucca glauca*) Grassland (CEGL002035) was removed from the Central Great Plains Mixedgrass Prairie group due to geography.

A.2. Northern Great Plains Dry Mixedgrass Prairie (G331)

1) Action: Review of the geographic extent of this group.

Rationale: When first described, the geographic extent of this Group was encompassed within the *Northwestern Great Plains Ecoregion* (43) of USEPA (2013). However, the Grama-needlegrass-wheatgrass (*Bouteloua-Stipa-Agropyron*; #57) of Kűchler , which corresponds to this type, suggests that this group is in drier conditions, hence the modifier, and distinct from the Omernik ecoregion. In fact, some maps combine this group with the Shortgrass Prairie.

Edits: The group is now attributed to Wyoming, Montana, and Alberta, and possibly occurs in the western Dakotas.

Tasks: Ascertain overlap of alliances and associations attributed to this group with the Northern Great Plains Mesic Mixedgrass Prairie (G141) and consider reassignment.

A.3. Northern Great Plains Mesic Mixedgrass Prairie (G141)

1) Action: Review of the geographic extent of this group. Alliances and associations in this group were also reviewed to assure their extent conforms to the group-level geography.

Rationale: Geographically, this group is largely circumscribed by the *Northwestern Great Plains Ecoregion* (43; USEPA 2013), but in mesic conditions, and extends from northern Nebraska to the Canadian Provinces. It is conceptually equivalent to Wheatgrass-needlegrass (*Agropyron – Stipa; #66*) of Kűchler (1964). Western mixedgrass prairie in Nebraska occurs on shallow limey soils but also where there is loess in the southwest portion of the state. The Pierre shale outrcops in northcentral Nebraska extend into South Dakota, and should be included within the Northern Great Plains Mesic Mixedgrass Prairie. But the Northwest Nebraska mixedgrass in Oglala belongs with Central Great Plains Mixedgrass Prairie.

Edits: Removed Colorado, Kansas, New Mexico, Oklahoma, and Texas from the extent.

Tasks: Within this group, a subtype of grasslands (A4031, A4034, A4028a) can be separated from a subtype of shrublands, based on physiognomy (A0954, A4035, A4036, A1537).

A.4 Great Plains Shortgrass Prairie (G144)

1) Action: Review of the geographic extent and alliance and associations in this group.

Rationale: The distribution and characterization of shortgrass prairie vegetation can be a product of grazing intensity, and if grazing pressure was reduced at a site, the vegetation could come to represent mixedgrass prairie. This is probably the case in portions of the shortgrass region in Colorado. The northern boundary corresponds to the High Plains of Fenneman (1931) and the Goshen Hole area in the North Platte River valley of Wyoming and Nebraska.

Edits: Based on recommendation of G. Steinauer (NE Heritage Program ecologist) and G. Jones (WY state Heritage ecologist) this group is restricted to SW Nebraska and SE Wyoming, respectively.

Tasks: 1) Review and edit shrubland alliances in the Great Plains Shortgrass Prairie Group. 2) Resolve whether a *Yucca glauca* - shortgrass prairie alliance should be added to the NVC and whether it is a ruderal type.

A.5 Intermountain Dry Tall Sagebrush Steppe & Shrubland (G303)

1) Action: Removed South Dakota and North Dakota from geographic extent of the group.

Rationale: These states do not occur within the geographic range of *Artemisia tridentata* ssp. *wyomingensis*.

A.6. Intermountain Mesic Tall Sagebrush Steppe & Shrubland (G302)

1) Action: Removed South Dakota and North Dakota from geographic extent of the group.

Rationale: These states do not occur within the geographic range of *Artemisia tridentata* ssp. *wyomingensis*.

A.7. Great Plains Sand Shrubland (G069) and Great Plains Sand Grassland (G068) —> (G888, G889)

1) Action: These two group were combined and subdivided into two new groups based on geography; Northern Great Plains Sand Grassland & Shrubland (G889), and Southern Great Plains Sand Grassland & Shrubland (G888).

Rationale: The geographic extent of the Great Plains Sand Shrubland and Great Plains Sand Grassland groups was unwieldy and could be logically divided into new units based on the ranges of constituent species.

Edits: Alliances and associations within the defunct Northern Great Plains Sand Grassland & Shrubland, and Northern Great Plains Sand Grassland & Shrubland groups were reassigned to the new groups. Likewise, states had to be reassigned.

1) Northern Great Plains Sand Grassland & Shrubland (G889) includes, in the U.S., Montana, Nebraska, North Dakota, South Dakota, Wyoming, and in Canada, includes Manitoba and Saskatchewan.

2) Southern Great Plains Sand Grassland & Shrubland (G888) includes Colorado, Kansas, New Mexico(?), Oklahoma, and Texas.

Tasks: Determine whether the presence of *Yucca glauca* in the Southern Great Plains Sand Grassland & Shrubland and Nebraska sand prairies warrants recognizing either a separate associations within A0816 or A1193, or possibly merits a distinct alliance.

A.8. Great Plains-Comanchian Ruderal Grassland & Shrubland (G680)

1) Action: Added the term *southern* to the name: Southern Great Plains-Comanchian Ruderal Grassland & Shrubland.

Rationale: The name Great Plains was overly encompassing. Diagnostic ruderal species that occur within Comanchian (sensu Dice, 1943) are shared with the Southern Great Plains.

APPENDIX B. CHANGES TO USNVC ALLIANCES

Changes to the geography, descriptions, and affiliated associations within NVC alliances as recommended by Heritage Program Ecologists, NatureServe staff, and other experts knowledgeable of the Great Plains region. Alliances are presented within their respective Groups.

I. GRASSLAND & SHRUBLAND ALLIANCES

B.1. Alliances in Central Great Plains Mixedgrass Prairie (G133)

B.1.1. *Pascopyrum smithii - Bouteloua gracilis* Great Plains Grassland Alliance (A4039)

Actions: 1) Revised alliance name. 2) Reviewed geography.

Edits: 1) Updated alliance name. Old name: *Pascopyrum smithii - Bouteloua gracilis* Central Great Plains Grassland Alliance. 2) Removed Wyoming, but retained New Mexico in geographic range of the alliance to better circumscribe this alliance as having a central Great Plains concept.

Rationale: New Mexico was retained within the alliance because patterns of species composition and area of occurrence within the state distinguish it from Shortgrass Prairie vegetation. Because this alliance represents loamy to clay soils in topographic swales, the question remains whether the alliance also occurs in the Oklahoma Panhandle, southeast Colorado and northeast New Mexico, where *B. gracilis* is not common in those conditions. This alliance is the mesic counterpart to A4042 (the dry *Schizachyrium scoparium - Bouteloua curtipendula* Central Great Plains Grassland Alliance).

Tasks: The alliance consists of two associations. Is this accurate? Are there additional associations that belong within this alliance? Based on the alliance description, a review of whether *Andropogon gerardii* moist (A4028b) should be circumscribed into A4039 is needed. Also, it should be ascertained whether this alliance (A4039), or a similar alliance, is appropriate for the Southern Mixedgrass Prairie region.

B.1.2. *Muhlenbergia reverchonii* Grassland Alliance (A4040)

Action: The alliance was reviewed, but no actions were taken.

Notes: This alliance occurs on tight clay soils that are wet in spring. Associations within this alliance tend to be small patch occurrences in the Arbuckle Mountains and the Edwards Plateau. There are similarities in the hydrology and clay soils (though in different series) in this alliance and the *Pascopyrum smithii - Bouteloua gracilis* Central Great Plains Grassland Alliance (A4039).

B.1.3. *Schizachyrium scoparium - Bouteloua curtipendula* Central Great Plains Grassland Alliance (A4042; Fig. 5)

Actions: 1) Revised alliance name. 2) Reviewed geography.

Rationale: This is currently the most widespread central mixedgrass alliance, thus a review of geography was warranted. This alliance is the dry counterpart to A4039 (the mesic *Pascopyrum smithii - Bouteloua gracilis* Great Plains Grassland Alliance).

Edits: 1) Updated alliance name: *Schizachyrium scoparium - Bouteloua curtipendula* Central Plains Grassland Alliance. 2) Removed Iowa, Missouri, North Dakota, and South Dakota from geographic extent. Although Colorado was retained within the geography, Colorado Natural Heritage Program staff noted that the alliance is very uncommon in Colorado and occurs at the scale of small patches.

Figure 5. ***Schizachyrium scoparium - Bouteloua curtipendula*** **Central Great Plains Grassland Alliance** (A4042) at the Wichita Mountains National Wildlife Refuge, Comanche County, Oklahoma. Photo by B. Hoagland.

B.1.4. *Andropogon gerardii* Central Mixedgrass Grassland Alliance (A4677) [new]

Action: This is a new alliance.

Edits: The alliance was split from the *Andropogon gerardii - Sorghastrum nutans* Mixedgrass Western Plains Grassland Alliance (A4028), as was *Andropogon gerardii - Sorghastrum nutans* Northern Mixedgrass Grassland Alliance (A4382) in Northern Great Plains Mesic Mixedgrass Prairie (G141).

Rationale: We recognized the need to create an alliance to represent stands dominated by *Andropogon gerardii* and other tall grasses in moist and bottomland situations in the central Great Plains. These stands lack typical tallgrass prairie diversity, especially forbs, and thus are treated separately from the Central

Lowlands Tallgrass prairie. Although primarily riparian vegetation, most sites that would foster this vegetation have been degraded by plowing and/or heavy livestock grazing.

Tasks: Whether this alliance persists in the current state, or circumscribed within *Pascopyrum smithii - Bouteloua gracilis* Great Plains Grassland Alliance (A4039) requires further discussion.

B.1.5. *Rhus trilobata* - Mixed Shrubs Central Mixedgrass Great Plains Shrubland Alliance (A4038)

Action: Revised alliance name.

Edits: Updated alliance name: *Rhus trilobata* Great Plains Shrubland Alliance.

Rationale: The updated name better reflects the geography of this alliance.

B.2. Alliances in Northern Great Plains Dry Mixedgrass Prairie (G331)

B.2.1. *Hesperostipa curtiseta - Elymus lanceolatus* Northern Grassland Alliance (A4029)

Action: Revised alliance name.

Edits: *Hesperostipa curtiseta - Elymus lanceolatus* Northern Dry Grassland Alliance

Rationale: Addition of the adjective "dry" reflects the alliance placement in G331.

B.2.2. Pseudoroegneria spicata - Pascopyrum smithii - Hesperostipa comata Northwestern Great Plains Grassland Alliance (A4032)

Action: 1) Revised alliance name. 2) Reviewed geography.

Edits: 1) Updated alliance name: *Pseudoroegneria spicata - Pascopyrum smithii - Hesperostipa comata* Northern Dry Great Plains Grassland Alliance. 2) Colorado and Nebraska were removed from the geographic extent of this alliance.

Rationale: The updated name solidifies placement of the Alliance within G331. Ecologists from Heritage Programs in Colorado and Nebraska confirmed that this alliance is not represented in their states; Nebraska because *Pseudoroegneria spicata* is a rare species in the state and Colorado because *P. spicata* is more abundant in the western portion of the state.

B.2.3. *Hesperostipa comata* Northwestern Great Plains Grassland Alliance (A4033)

Actions: 1) Revised alliance name. 2) Reviewed geography.

Edits: 1) Updated name: *Hesperostipa comata* Northern Dry Grassland Alliance. 2) Removed Colorado and Kansas from geographic extent.

Rationale: The updated name solidifies placement of the Alliance within G331. Based on comments from ecologists in the respective Heritage Programs, Colorado and Kansas were removed.

B.2.4. *Festuca idahoensis - Carex inops ssp. heliophila* Great Plains Grassland Alliance (A4037) [archived]

Action: Alliance merged into A4389, and its one association - *Festuca idahoensis – Carex inops ssp. heliophila* Grassland (CEGL001610) – was moved there.

Rationale: The alliance represented an outlier of *Festuca idahoensis* stands, but they have similarity to other mixedgrass stands.

B.2.5. *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance (A43810) [new]

Actions: New alliance.

Edits: Moved all sagebrush and related shrubland types that were in the Great Plains to their own alliance, rather than a Great Basin alliance.

Rationale: Many of these associations have mixedgrass floristics and may even occur in a grassland matrix on the landscape, and creating this alliance helps recognize the ecological gradient from Great plains to Great Basin. See table below for a synopsis of the new alliance and its member associations.

A4381. *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance		
	CEGL00099	*Artemisia tridentata - Atriplex confertifolia* Shrubland
3		
	CEGL00133	*Ericameria nauseosa / Pseudoroegneria spicata* Shrubland
0		
	CEGL00144	*Atriplex gardneri / Artemisia tridentata* Dwarf-shrubland
0		
	CEGL00144	*Atriplex gardneri / Monolepis nuttalliana* Dwarf-shrubland
3		
	CEGL00144	*Atriplex gardneri / Pascopyrum smithii* Dwarf-shrubland
5		
	CEGL00145	*Artemisia pedatifida / Pascopyrum smithii* Shrubland
1		

5	CEGL008295	*Artemisia tridentata ssp. wyomingensis / Bouteloua gracilis* Northwestern Plains Shrubland
8	CEGL008298	*Krascheninnikovia lanata / Hesperostipa comata* Great Plains Dwarf-shrubland
9	CEGL008299	*Artemisia tridentata* ssp. *wyomingensis / Pascopyrum smithii - Pseudoroegneria spicata* Shrub Grassland

B.3. Alliances in Northern Great Plains Mesic Mixedgrass Prairie (G141)

B.3.1. *Andropogon gerardii - Sorghastrum nutans* Grassland Alliance (A4382) [new]

Actions: Created a new alliance by splitting A4028 with changes to 1) concept, 2) name, and 3) geography.

Edits: The alliance was split from the *Andropogon gerardii - Sorghastrum nutans* Mixedgrass Western Plains Grassland Alliance (A4028), as was *Andropogon gerardii - Sorghastrum nutans* Central Mixedgrass Grassland Alliance (A4677) in Central Great Plains Mixedgrass Prairie (G133). 1) Four associations in the original alliance (A4028) were reassigned to this alliance. 2) Updated name: *Andropogon gerardii - Sorghastrum nutans* Northern Mixedgrass Alliance. 3) Based on the realignment of associations, Kansas, New Mexico, and Oklahoma were removed from the geographic extent of this alliance.

Rationale: Previously, stands dominated by *Andropogon gerardii - Sorghastrum nutans* were assigned to the Central Lowlands Tallgrass Prairie Macrogroup (M054) and other relevant groups. The constituent grass species of this alliance, however, exhibit both broad geographic ranges and tendencies of ecological generalist and as a result, they alone are not useful diagnostic species. This classification alignment situates the alliance in the mixedgrass prairie and recognizes it as a distinct alliance from tallgrass prairie types in M054. Stands in this alliance lack forbs and other grasses typical of tallgrass vegetation. Finally, we placed western big bluestem stands into this northern alliance separate from the central alliance. See table below for a synopsis of the new alliance and its member associations.

A4382. *Andropogon gerardii - Sorghastrum nutans* Northern Mixedgrass Grassland Alliance		MT, ND, SD, WY
CEGL001463	*Andropogon gerardii - Schizachyrium scoparium* Northwestern Plains Grassland	CO, MT, ND?, SD, WY
CEGL002023	*Andropogon gerardii - Panicum virgatum* Sandhills Grassland	ND?, NE, SD
CEGL002205	*Andropogon gerardii - Schizachyrium scoparium* Northern Plains Grassland	MT, ND, SD, SK?, WY
CEGL002376	*Andropogon gerardii - Sporobolus heterolepis - Schizachyrium scoparium - Pascopyrum smithii* Grassland	MB, ND, SD, SK

B.3.2. *Pascopyrum smithii - Nassella viridula* Northern Mesic Mixedgrass Grassland Alliance (A4031)

Actions: 1) Revised alliance name. 2) Reviewed geography.

Edits: 1) Updated name: *Pascopyrum smithii - Nassella viridula* Northern Mesic Mixedgrass Grassland Alliance. 2) Removed Colorado from geographic range.

Rationale: Occurrences of this alliance are north of the Pine Ridge in Nebraska, although *Nassella viridula* occurs inconsistently. This alliance is in the north-central Great Plains, with a more mesic climate than the somewhat similar A4032 alliance in the Northern Great Plains Dry Mixedgrass Prairie (G331) (*Pseudoroegneria spicata - Pascopyrum smithii - Hesperostipa comata* Northwestern Great Plains Grassland Alliance (A4032)).

B.4. Alliances in Great Plains Shortgrass Prairie (G144)

B.4.1. *Bouteloua gracilis - Bouteloua hirsuta - Bouteloua curtipendula* Shortgrass Prairie Alliance (A4001)

Action: The alliance was reviewed, but no actions were taken.

Task: Compare and consider merging this alliance with the *Bouteloua gracilis - Bouteloua dactyloides* Shortgrass Prairie Alliance (A4000), but soil differences may be reflected in vegetation distinctions. Determine if this alliance occurs in Arizona and New Mexico.

Note: This alliance occurs on typic soils.

B.4.2. *Artemisia frigida - Dalea formosa - Gutierrezia sarothrae* Dwarf-shrubland Alliance (A3999) [archived]

Action: Alliance to be merged with A4001, *Bouteloua gracilis - Bouteloua hirsuta - Bouteloua curtipendula* Shortgrass Prairie Alliance

Rationale: This alliance concept is weak, being based on two dwarf-shrubland - grassland types. The physiognomy and floristics are neither distinct nor widespread enough to warrant a separate alliance.

Tasks: Merge with A4001 and move CEGL002782 *Artemisia frigida / Bouteloua gracilis* Dwarf-shrubland and CEGL005011 *Gutierrezia sarothrae - Yucca glauca* Dwarf-shrubland to that alliance.

B.4.3. *Bouteloua gracilis - Bouteloua hirsuta - Hesperostipa neomexicana* Shortgrass Prairie Alliance (A4002)

Action: Reviewed geographic extent of this alliance.

Edits: Oklahoma and Texas were added to the range of this alliance.

Rationale: Ecologist familiar with the region advocated for this change.

B.4.4 *Bouteloua gracilis - Bouteloua dactyloides* Shortgrass Prairie Alliance (A4001)

Action: Reviewed the membership of associations.

Edits: There are two associations in this alliance, after edits are implemented.

Rationale: Concept of this alliance is based on distinctive soils and disturbance, but further review of floristic differences with A4001 are needed.

Tasks: Discuss the possibility of merging with the *Bouteloua gracilis - Bouteloua hirsuta - Bouteloua curtipendula* Shortgrass Prairie Alliance (A4001).

Note: Occurs on heavy soils and in dry swales and is often a product of heavy grazing.

II. SAND GRASSLANDS & SHRUBLANDS

The former Great Plains Sand Shrubland (G069) and Great Plains Sand Grassland (G068) were merged and then split into Southern Great Plains Sand Grassland & Shrubland (G888) and Northern Great Plains Sand Grassland & Shrubland (G889) based on strong floristic, physiognomic and climatic differences.

B.5. Alliances in Northern Great Plains Sand Grassland & Shrubland (G889) [new]

Action: Two former groups were revised

from:

- G069 Great Plains Sand Shrubland
- G068 Great Plains Sand Grassland

to:

- G888 Southern Great Plains Sand Grassland & Shrubland
- G889 Northern Great Plains Sand Grassland & Shrubland

Rationale: See main text for rationale.

B.5.1. *Yucca glauca - Calamovilfa longifolia* Sand Prairie Scrub Alliance (A1540)

Action: Reviewed 1) the conceptual basis and 2) geographic extent of the alliance.

Edits: Removed Kansas, Oklahoma, and Texas. Changed name to *Yucca glauca - Calamovilfa longifolia* Sand Prairie Scrub Alliance.

Rationale: Actions taken were based upon recommendation from Heritage Ecologists. Removed Kansas, Oklahoma, and Texas to narrow concept to northern Great Plains.

B.5.2. *Calamovilfa longifolia – Andropogon hallii* Sand Prairie Alliance (A1201)

Action: Reviewed alliance name and concepts. Noted this is a northern alliance.

Edits: Revised name to include *Andropogon hallii*.

Rationale: This alliance is the northern equivalent of A1193 *Andropogon hallii- Calamovilfa gigantea* Sand Prairie Alliance.

B.6. Alliances in Southern Great Plains Sand Grassland & Shrubland (G888) [new]

Action: Two former groups were revised

from:

- G069 Great Plains Sand Shrubland
- G068 Great Plains Sand Grassland

to:

- G888 Southern Great Plains Sand Grassland & Shrubland
- G889 Northern Great Plains Sand Grassland & Shrubland

Rationale: see main text for rationale.

B.6.1. *Sapindus saponaria* Prairie Scrub Alliance (A0627)

Action: Reviewed the 1) conceptual basis and 2) geographic extent of the alliance. Moved alliance to the Cross Timbers Group (G017: now G887).

Edits: Added Kansas, Oklahoma, and Texas. Updated name to *Sapindus saponaria* Scrub Woodland Alliance.

Rationale: Because ecologists described the habitat as deep sands and rolling plains within the Great Plains, this alliance fits better with Great Plains Forest & Woodland macrogroup (M151) within G017 (now G887) – Cross Timbers Woodland group.

Tasks: Ascertain whether this alliance should be classified as a woodland or retained as scrub. For now, we recognized this as a woodland alliance and moved to G017; now G887 – Cross Timbers Woodland group.

See B.23.2 below.

B.6.2. *Artemisia filifolia* Great Plains Sand Prairie Scrub Alliance (A0816; Fig. 6)

Action: Reviewed geographic extent of the alliance.

Edits: Removed "Great Plains" from the name. Removed South Dakota from the geography of this alliance.

Rationale: The name change reflects the broader geographic extent of the alliance.

Tasks: Determine whether the alliance occurs in Wyoming. Participants agreed that *Yucca glauca* occurs as an element in this Alliance. *Yucca glauca*, however, is not restricted to sandy soils and can occur on loamy soils in Nebraska. In Texas, north of Amarillo, *Y. glauca* is most common on sandy loam soils, and is supplanted by *Artemisia filifolia* on deep, sandy soils. Regarding the distribution of *A. filifolia* in Nebraska, see the note above in *Andropogon hallii* Sand Prairie Alliance (B.6.4).

Figure 6. *Artemisia filifolia* Great Plains Sand Prairie Scrub Alliance (A0816) in Cimarron County, Oklahoma. Photo by B. Hoagland.

B.6.3. *Quercus havardii* Prairie Scrub Alliance (A4112)

Action: Reviewed alliance 1) name and 2) geographic extent.

Edits: New name: *Quercus havardii / Schizachyrium scoparium* Scrub Alliance

Rationale: The name change reflects the importance of *S. scoparium* in the understory and interstitial spaces.

B.6.4. *Andropogon hallii* Sand Prairie Alliance (A1193)

Action: Reviewed alliance 1) name and 2) geographic range.

Edits: 1) New name: *Andropogon hallii - Calamovilfa gigantea* Sand Prairie Alliance (A1193) to highlight the southern distribution of this type. 2) Removed Manitoba, Montana, North Dakota, South Dakota, and Saskatchewan, and added New Mexico to the extent.

Rationale: This alliance is the southern equivalent of A1201. Ecologists concluded that *Yucca glauca* can be an associate in this alliance. Because this species can be dominant or co-dominant in some locations, a separate *Yucca glauca* Southern Sand Grassland Alliance (Comparable to the Northern *Yucca glauca* Sand Grassland Alliance [A1540]) should be developed, or at least an association within A0816. The Nebraska Heritage ecologist noted that all *Calamovilfa gigantea* populations in that state are introduced. Geographically, the communities of *Artemisia filifolia* in the southwestern corner of Nebraska have several associated species that exhibit southern floristic affinities. These species do not occur in *Artemisia filifolia* communities north of the Platte River, and should be considered Sandhills Prairie communities with *Artemisia filifolia* as an associated species, not a shrubland.

Note: *Yucca glauca* was an associated species in this alliance.

III. COMANCHIAN VEGETATION

B.7. Alliances in Comanchian Barrens & Glade (G598)

B.7.1. *Sedum spp. - Schizachyrium scoparium* Comanchian Open Grassland Alliance (A3308)

Action: Reviewed alliance concept, no actions taken.

B.7.2. *Quercus sinuata var. breviloba* Scrub Alliance (A4116)

Action: Reviewed alliance concept; no actions taken.

B.7.3. *Juniperus pinchotii - Quercus mohriana* Scrub & Woodland Alliance (A3246)

Action: Reviewed alliance concept; no actions taken.

B.8. Alliances in Comanchian Mesquite - Mixed Scrub (G192)

B.8.1. *Prosopis glandulosa* Scrub Woodland Alliance (A3247; Fig. 7)

Action: Reviewed alliance concept, no actions taken.

Figure 7. *Prosopis glandulosa* Scrub Woodland Alliance (A3247) in the gypsum hills of Jackson County, Oklahoma. Photo by B. Hoagland.

B.8.2. *Dalea formosa* Dwarf-shrubland Alliance

Action: Reviewed alliance concept; no actions taken.

IV. SAGEBRUSH

B.9. *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance (A4381) and alliances in Intermountain Dry Tall Sagebrush Steppe & Shrubland (G303)

This new alliance was created to "corral" a number of associations that were dispersed among a number of Great Basin sagebrush alliances. The tasks here were to move associations to correctly reflect geographic distributions.

B.9.1. *Artemisia tridentata ssp. wyomingensis* Dry Steppe & Shrubland Alliance (A3184)

Action: Reviewed alliance geography.

Edits: Removed North Dakota from geographic extent of the Alliance.

Rationale: *Artemisia tridentata* ssp. *wyomingensis* does not occur in North Dakota. See new alliance, *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance (A4381).

B.9.2. *Artemisia tridentata* - Mixed Shrub Dry Steppe & Shrubland Alliance (A3198)

Action: Reviewed alliance; no action taken. Alliance is not tracked in Great Plains

Intermountain Mesic Tall Sagebrush Steppe & Shrubland (G302).

B.9.3. *Artemisia tridentata ssp. wyomingensis* Mesic Steppe & Shrubland Alliance (A3182)

Action: Reviewed alliance geography.

Edits: Removed South Dakota and North Dakota from geographic extent of the group.

Rationale: These states do not occur within the geographic range of *Artemisia tridentata* ssp. *wyomingensis.* See new alliance - *Atriplex gardneri - Artemisia tridentata* Northwestern Plains Dwarf-shrubland Alliance (A4381).

V. RUDERAL GRASSLANDS & SHRUBLANDS

B.10. Alliances in Southern Great Plains-Comanchian Ruderal Grassland & Shrubland (G680)

B.10.1 *Prosopis glandulosa* Shortgrass Prairie Ruderal Scrub Alliance (A3952)

Action: Reviewed alliance 1) name and 2) associated species.

Edits: Changed name to *Prosopis glandulosa* Shortgrass Prairie Ruderal Scrub Alliance.

Rationale: The name Great Plains was too general, as the diagnostic ruderal species occur in both the Comanchian (sensu Dice, 1943) and the Southern Great Plains.

B.10.2. Great Plains-Comanchian Ruderal Grassland Alliance (A4233)

Action: Reviewed alliance 1) concept and 2) name.

Edits: Changed name to reflect group name: Great Plains-Comanchian Ruderal Grassland Alliance.

Tasks: Several new associations were proposed for inclusion in this alliance, which are listed below. Prior to adoption, however, each association will require vetting by peer reviewers and complete descriptions will need to be drafted, if adopted. The proposed associations are:

1. *Agropyron cristatum* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

2. *Festuca arundinacea* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist. Can occur in wet to mesic conditions and in riparian areas.

3. *Cytodon dactylon* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

4. *Sorghum halapense* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

5. *Eragrostis lehmanii - Eragrostis curvula* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

6. Broad-leaved weed patch Ruderal Great Plains (*Amaranthus* spp., *Chenopodium* spp., *Kochia* spp., *Salsola* spp.) Association.

Note: A potpourri of despair.

7. *Bromus inermis - Poa pratensis* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

8. *Bromus tectorum - Bromus* spp. Ruderal Great Plains Association.

Note: No note.

9. *Bromus catharticus - Bromus arvensis (japonicum)* Ruderal Great Plains Association.

Note: No note.

10. *Lolium perenne* Ruderal Great Plains Association.

Note: Planted and naturalized occurrences exist.

B.10.3. Great Plains - Comanchian Ruderal Shrubland Alliance (A4232)

Action: Reviewed name and associated species.

Edits: Changed name to reflect Group name: Southern Great Plains - Comanchian Ruderal Shrubland Alliance.

B.11. Alliances in Northern & Central Great Plains Ruderal Grassland & Shrubland (G679)

B.11.1. *Phleum pratense - Poa pratensis - Bromus inermis* Ruderal Grassland Alliance (A4250)

Action: Alliance reviewed; no action taken.

2) *Euphorbia esula - Cirsium arvense* Mixed Ruderal Forbland Alliance (A4249)

B.12. Alliances in Great Plains Native Ruderal Woodland Group (G891) [new]

This is a new group within a new macrogroup, the Great Plains Ruderal Woodland (M524).

B.12.1. *Juniperus virginiana* Ruderal Woodland Alliance [proposed]

Action: A proposed new alliance, currently submitted for review.

Note: This alliance would consist of *Juniperus virginiana / Schizachyrium scoparium - Amphiachyris dracunculoides* Woodland Association (CEGL004209), which currently has a low classification confidence score and is considered poorly documented.

Tasks: Complete concept development and identify geographic extent of the alliance.

B.13. Alliances in Great Plains Exotic Ruderal Woodland (G892) [new]

B.13.1 *Robinia pseudoacacia* – Exotic Hardwoods Ruderal Woodland Alliance (A4396) [new]

Action: A new alliance found in the Great Plains and dominated by a variety of exotic hardwoods, particularly *Robinia pseudoacacia.*

Note: This alliance consists of the *Robinia pseudoacacia* Ruderal Woodland Association (CEGL008288).

Tasks: Complete concept development and identify geographic extent of the Alliance.

VI. FORESTS AND WOODLANDS

B.14. Alliances in Great Plains Bur Oak Forest & Woodland (G329)

B.14.1. *Quercus macrocarpa / Corylus spp. /* Mixedgrass Woodland Alliance (A0620)

Action: Reviewed alliance name and geographic extent.

Edits: Revised name to *Quercus macrocarpa* Central Tallgrass Woodland Alliance.

Rationale: The current alliance is primarily a central Midwest Tallgrass Prairie Woodland Alliance that extends into parts of the eastern mixedgrass prairie. Therefore, this alliance is moved to North-Central Oak - Hickory Forest & Woodland Group (G649). See *Quercus macrocarpa* / Mixedgrass Woodland Alliance (A1505) in G329 for the mixedgrass equivalent.

B.14.2. *Quercus macrocarpa* Forest Alliance (A0245) [archived]

Actions: Reviewed alliance concept.

Edits: Merged the alliance with the *Populus tremuloides* / *Corylus* spp. Woodland Alliance (A3250); archived (deleted) this alliance from the USNVC.

B.14.3. *Quercus macrocarpa /* Mixedgrass Woodland Alliance (A1505)

Actions: Reviewed alliance concept; no changes made.

Note: It was agreed that the quantity of data that are available to support this alliance and the associations are limited.

B.15. Alliances in Great Plains Mesic Forest & Woodland (G145)

B.15.1. *Juniperus scopulorum - Juniperus virginiana* Woodland Alliance (A3210)

Action: Reviewed alliance 1) name and 2) geographic extent.

Edits: 1) Name was revised as *Juniperus scopulorum* Woodland Alliance. 2) Geographic extent includes Colorado, Montana, North and South Dakota, Nebraska, and Wyoming.

Rationale: Although a degree of overlap occurs in the ranges of *Juniperus scopulorum* and *Juniperus virginiana*, stands consisting of the two species are not known within the geographic extent of the alliance.

B.15.2. *Fraxinus pennsylvanica - Ulmus americana* Great Plains Forest Alliance (A3211)

Action: Alliance reviewed; no action taken.

B.15.3. *Betula papyrifera - Populus tremuloides - Quercus macrocarpa* Forest Alliance (A3209)

Action: Reviewed the concept of the alliance.

Edits: The alliance and its associations (with the exception of the *Betula papyrifera* - (*Tilia americana, Quercus macrocarpa*) Canyon Forest [CEGL002013]) were moved to the Northeastern Great Plains Aspen Woodland Group (G146).

B.16. Alliances in Northeastern Great Plains Aspen-Oak Woodland (G146)

B.16.1. *Populus tremuloides - Populus balsamifera / Corylus americana* Forest Alliance (A3249)

Action: Alliance reviewed; no action taken.

B.16.2 *Populus tremuloides/ Corylus spp.* Woodland Alliance (A3250)

Action: Reviewed alliance name.

Edits: Name was revised as *Populus tremuloides- Quercus macrocarpa* / *Corylus* spp. Woodland Alliance.

Task: Determine whether this alliance should be merged with the *Populus tremuloides - Populus balsamifera / Corylus americana* Forest Alliance (A3249).

B.17. Alliances in Northwestern Great Plains Aspen Woodland (G328)

B.17.1. *Betula papyrifera / Corylus cornuta* Woodland Alliance (A3248)

Action: Alliance reviewed; no action taken.

B.18. Alliances in Central Midwest Oak Openings & Barrens (G181)

B.18.1. *Quercus velutina - Quercus ellipsoidalis* Wooded Grassland Alliance (A1492)

Action: Alliance reviewed; no action taken.

B.18.2. *Quercus macrocarpa - Quercus alba* Wooded Grassland Alliance (A3256)

Action: Alliance reviewed; no action taken.

B.19. Alliances in North-Central Oak - Hickory Forest & Woodland (G649)

B.19.1. *Quercus alba - Quercus rubra - Carya spp.* North-Central Forest Alliance (A3323)

Action: Alliance reviewed; no action taken.

Note: This alliance occurs as a dry-mesic forest.

B.19.2. *Pinus strobus - Quercus spp.* Driftless Forest & Woodland Alliance (A3327)

Action: Alliance reviewed; no action taken.

B.19.3. *Quercus alba - Quercus macrocarpa - Quercus bicolor* Woodland Alliance (A3324)

Action: Alliance reviewed; no action taken.

Note: This alliance occurs as a dry-mesic woodland.

B.19.4. *Quercus velutina - Quercus alba* North-Central Forest Alliance (A3326)

Action: Alliance reviewed; no action taken.

Note: This alliance occurs as a dry forest and woodland.

B.19.5. *Quercus macrocarpa* Central Tallgrass Woodland Alliance (A0620)

Action: Revised alliance name to make it distinct from A0620 *Quercus macrocarpa / Corylus spp. /* Mixedgrass Woodland Alliance.

B.20. Alliances in Rocky Mountain Foothill-Rock Outcrop Limber Pine - Juniper Woodland (G209)

B.20.1. *Pinus flexilis /* Grass Understory Central Rocky Mountain Woodland Alliance (A3210)

Action: Alliance reviewed; no action taken.

B.21. Alliances in Rocky Mountain Foothill-Rock Outcrop Limber Pine - Juniper Woodland (G209)

B.21.1. *Juniperus osteosperma - Juniperus scopulorum /* Shrub Understory Central Rocky Mountain Woodland Alliance (A3426)

Action: Reviewed alliance 1) name and 2) geographic extent.

Edit: Removed South Dakota from the geography.

B.21.2. *Pinus flexilis /* Grass Understory Central Rocky Mountain Woodland Alliance (A3425)

Action: Reviewed alliance 1) name and 2) geographic extent.

Edit: Removed South Dakota from the geography.

Rationale: *Pinus flexilis* is an S1 species in SD.

B.22. Alliances in Intermountain Semi-Desert Steppe & Shrubland Group (G310)

B.22.1. *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance (A3202)

Action: Alliance reviewed; no action taken.

B.23. Alliances in Cross Timbers Woodland (G017; now G887)

Action: This group dominated by tree species that, although eastern, extend into the Great Plains

Rationale: These woodland stands were not accounted for in the USNVC.

B.23.1. *Juniperus virginiana* Woodland Alliance(A4395) [new]

Action: A new alliance within a proposed new group.

Rationale: This native juniper woodland type was not accounted for in the USNVC.

B.23.2. *Sapindus saponaria* Scrub Woodland Alliance (A0627)

Action: Reviewed the 1) conceptual basis and 2) geographic extent of the alliance and moved it here to this group.

Edits: Added Kansas, Oklahoma, and Texas. Updated name from *Sapindus saponaria* Prairie Scrub Alliance to *Sapindus saponaria* Scrub Woodland Alliance.

Rationale: This type is moved to Great Plains woodland (M151) and to the Cross Timbers Woodland Group (G017; now G887). Ecologists in the region described the habitat of this as deep sands and rolling plains.

Tasks: We recognize this as a woodland alliance and move it to the Cross Timbers Woodland Group (G017; now G887)

To learn more about the U.S. National Vegetation Classification:
Web publication of the USNVC: http://usnvc.org/
Proceedings of the USNVC: http://proceedings.usnvc.org/