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Terrestrial Natural Communities of Nebraska

(Version III – June 30, 2003)

By

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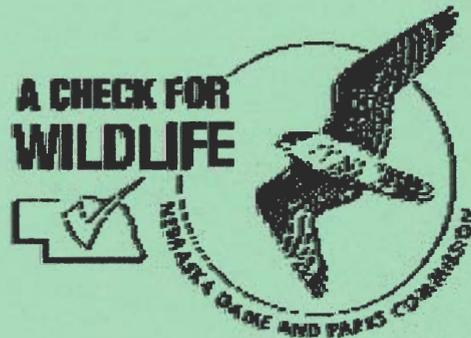


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INTRODUCTION

For more than a decade, The Nature Conservancy (TNC) and state natural heritage programs, including the Nebraska Natural Heritage Program (NNHP), have used a “coarse filter/fine filter” approach to preserving biological diversity (The Nature Conservancy 1994). This approach involves identification and protection of natural communities (coarse filter) as well as rare species (fine filter). Identifying and protecting representative examples of natural communities ensures conservation of most species, biotic interactions and ecological processes. Those species that “fall through” the community filters are generally the rare species. Identification and protection of viable occurrences of rare species serves as the fine filter for preserving biological diversity. Using communities as a coarse filter has ensured that conservation efforts are working to protect a more complete spectrum of biological diversity, not just those species whose priority conservation status has been documented. By protecting communities many species not generally target for conservation, such as poorly known groups such as fungi and invertebrates, are protected. Furthermore, communities are an important tool for systematically characterizing the current pattern and condition of ecosystems and landscapes. The *Terrestrial Natural Communities of Nebraska* was developed primarily as a tool to aid in the conservation of biological diversity by providing a systematic classification of the natural communities found in the state

This classification defines 70 terrestrial natural community types, including 40 upland types and 30 wetland types, for Nebraska. By definition, natural communities are made up of species that respond similarly to a complex of climatic, soil, topographic, geologic, hydrologic, historical, and other site attributes. Therefore, the underlying assumption is that vegetation is the best indicator of these environmental features. The communities within this classification were defined primarily by their plant composition (existing and not potential vegetation) and to a lesser extent by soils, hydrology, geology, and other site attributes. This classification includes early successional communities (e.g. willow sandbar) through late successional communities types (e.g. eastern riparian forest) and types that are maintained by natural and possibly anthropogenic disturbance regimes (e.g. sandbar/mudflat). The stream (riverine) and lake (lacustrine) communities of Nebraska are not included in this classification.

CLASSIFICATION DEVELOPMENT

A major obstacle to using communities as conservation units has been the lack of a consistent national classification scheme. To overcome this problem, TNC, in conjunction with state heritage programs, developed a standardized hierarchical system to facilitate the identification and classification of vegetated terrestrial communities. TNC published the first edition of the U.S. National Vegetation Classification, which introduced the classification (Grossman et al. 1998) and provided a list to the units across the country (Anderson et al. 1998). Faber-Langendoen (1999) published a version of the TNC classification for the Midwestern portion of the United States, which includes Nebraska.

In 2001, NatureServe, a nonprofit organization that provides scientific information and tools to help guide effective conservation, took over responsibilities for maintaining and updating the national vegetation classification from TNC. The goal of NatureServe’s classification system is

to be consistent and flexible enough to meet the science and conservation objectives of various organizations and individuals, including TNC, state heritage programs, federal and state agencies, academic institutions and other conservation organizations. The classification is consistent throughout the United States at appropriate scales for conservation planning and the management and long-term monitoring of ecological communities and ecosystems. The structure and classification system used in the *Terrestrial Natural Communities of Nebraska* is consistent with those of NatureServe's national classification. The natural community types listed in this document have been incorporated into NatureServe's classification (viewable at www.natureserve.org/).

Since its inception in 1987, The NNHP has been collecting information on the natural communities of Nebraska from published and unpublished literature, knowledgeable individuals, and field surveys. The NNHP published its first descriptions of Nebraska's natural communities in 1989 (Steinauer 1989). These descriptions were based primarily on information gathered from published and unpublished literature with little field data to verify the classification. The natural communities included in this document were for the most part rather broadly defined and the descriptions somewhat general. Since 1995, the NNHP has collected extensive field data on natural community types of the state. This data has been used to refine the classification and develop more detailed descriptions of the state's natural community types. Unpublished versions of the *Terrestrial Natural Communities of Nebraska* were produced by the NNHP in 1997 (Steinauer and Rolfsmeier 1997) and 2000 (Steinauer and Rolfsmeier 2000). This document is a revised version of the 1997 and 2000 classifications.

The classification of natural communities is a somewhat subjective process. The pattern of vegetation on the landscape is rarely found in discrete, easily definable units. For this document we have classified the Nebraska landscape into natural community types to our best abilities using knowledge gained from our own fieldwork and from the work of other plant ecologists. Other individuals assigned with the same task may have classified the Nebraska landscape into different community types.

VEGETATION HIERACHY

The *Terrestrial Natural Communities of Nebraska* follows a classification hierarchy developed by TNC (The Nature Conservancy 1994). The top level of the this classification is divided into three "systems": terrestrial, aquatic, and subterranean. Terrestrial communities are those with rooted vegetation including rooted aquatic vegetation. Aquatic communities are deep open water communities without rooted vegetation. Subterranean communities are caves (Nebraska has no natural caves). This classification includes only terrestrial communities, which includes those communities commonly referred to as uplands and wetlands (palustrine systems). Wetland communities have the following diagnostic characteristics which are absent in upland communities: 1) vegetation dominated by hydric macrophytes, 2) hydric soils, and 3) periodic or permanent flooding at mean depths of < 2 meters, or the soil is saturated to the surface at some time during the growing season (Cowardin et al. 1979). Wetlands include open water communities lacking hydric macrophytes, but with all the following characteristics: 1) area < 8

ha (20 ac), 2) lacking active wave-formed or bedrock shoreline features, 3) water depth in the deepest part of the basin less than 2 m at low water.

This classification arranges communities by wetland and upland type and then by “physiognomic class” (e.g. forest, woodland, shrubland, herbaceous, or sparsely vegetated type). The physiognomic class can be determined for each community type by assessing the relative percentage of canopy cover of the life form comprising the upper most stratum (tree, shrub, herbaceous). The physiognomic classes are defined as follows:

Forest - Forests are dominated by trees > 5 m tall with > 60% canopy cover. The canopy of most forest trees are not widely spreading, are fairly short, and confined to the upper third of the stem. Nearly always two layers of woody plants are prominent.

Woodlands - Woodlands have a tree layer >5 m tall with 25-60 % canopy cover. The tree canopy is often discontinuous (often clumped). The lower canopy branches are widely spreading, are visibly longer than in forest trees, and may originate halfway up the stem. Nearly always only one layer of woody plants is prominent in woodlands.

Shrublands - Shrublands have a shrub layer < 5 m tall with > 25 % canopy cover. Tree cover is <25 %.

Herbaceous - Herbaceous communities are dominated by a layer of graminoids and/or forbs with a canopy cover > 25 %. Tree and shrub cover are both < 25 %.

Sparsely Vegetated Communities - Sparsely vegetated communities have a herbaceous cover < 25 %. Tree and shrub cover are also <25%. Sparsely vegetated communities also have the following characteristics: 1) soil that is thin or absent with parent material near or at the surface and 2) the community is maintained indefinitely at an early stage of succession by the substrate or by natural disturbance.

The natural communities in this document have been defined at what is generally referred to as the association level. To standardize and ensure consistency, the definition of a plant association put forth by the Third International Botanical Congress has been adapted for use in this classification and by TNC in their national classification (Grossman et al. 1998). The definition is as follows: “a plant community of definite floristic composition, presenting a uniform physiognomy, and growing in uniform habitat conditions.” (Flahalut and Schroter 1910). It is necessary to clarify the following points regarding this definition:

- 1) “Habitat” refers to the combination of environmental conditions and ecological processes influencing the community.
- 2) Uniformity of physiognomy and habitat conditions may include patterned heterogeneity (e.g. swale and swell topography in a meadow)
- 3) As a rule, communities recur over the landscape.

- 4) The scale of the classification varies on a community-by-community basis. Among other factors, the variation is determined by the apparent homogeneity of the occurrences across the landscape, the amount of data that has been collected, and the interpretation of this data by NNHP staff.
- 5) The natural community may be composed of a complex of plant associations (or zones) that constitutes a functioning ecological unit if the plant associations generally occur together (e.g. pond marshes often contain the same zones of submerged and emergent vegetation).

COMMUNITY NOMENCLATURE

Global names were assigned to each natural community type listed in this document by TNC (Faber-Langendoen 1999, Grossman et al. 1998). These names are based on the scientific names of the diagnostic species found in the community over its entire range. Some diagnostic species included in the global name are not found or do not play a predominant role in the community in Nebraska's portion of the community's range. A few examples occur where two community types within this document share the same global name (e.g. Pine Ridge Sandy Slope Prairie and Western Sandy Slope Prairie both have the global name *Calamovilfa longifolia* – *Stipa comata* Herbaceous Vegetation). There are also cases where one Nebraska community type is included under two or more global types (e.g. the Western Floodplain Terrace Grassland falls under the following two global community types: *Pascopyrum smithii* – *Distichlis spicata* Herbaceous Vegetation and *P. smithii*– *Nassella viridula* Herbaceous Vegetation).

In the global names, plant species used in the names occurring in the same vegetation stratum were separated by the “-” symbol, and those occurring in different strata of the vegetation were separated by the “/” symbol (e.g. *Fraxinus pennsylvanica* – *Ulmus americana* / *Ostrya virginiana* Canyon Woodland). In those cases where the diagnostic species were unknown or in question, environmental modifiers or broad vegetation or geographic modifiers were used as placeholders until the diagnostic species become known with more certainty (e.g. *Pascopyrum smithii* – *Stipa comata* Central Mixedgrass Herbaceous Vegetation). There are situations in which a diagnostic species may not be found within every occurrence of a community. When this happens on a range wide perspective the species has been placed within parentheses in the global name (e.g. *Schizachryium scoparium* – *Bouteloua curtipendula* – *Bouteloua hirsuta* – (*Yucca glauca*) Herbaceous Vegetation). Nature Serve has documented some communities that contain two diagnostic species, but neither of the diagnostic species are consistently present in all occurrences. In this situation, both the diagnostic species' names are put in parentheses (e.g. *Cornus drummondii* – (*Rhus glabra*, *Prunus* spp.) Shrubland).

State names for the communities (those in bold at the top of the descriptions) are based on the most characteristic biotic or abiotic features of the community type within the Nebraska portion of the communities' range (e.g. Ponderosa Pine Forest and Western Alkaline Marsh). State names are comparable to common names for plant species and are designed for more general use.

COMMUNITY RANKING

The natural community types included in this classification have been ranked on a scale of 1 to 5 according to their relative rarity and endangerment on a state (state rank) and range wide (global rank) perspective. The NNHP assigns the state ranks and NatureServe assigns the global ranks. The two major criteria that determine a community's ranks (state and global) are the total number of occurrences and the total area (acreage) of the community type. Measures of geographic range, trends in status (expanding or shrinking range or numbers), trends in condition of remaining acreage, threats, and fragility are secondary factors that are considered when assigning ranks.

The ranking system is intended to help determine conservation priorities, whereby more endangered community types are considered higher priority for conservation efforts. At the same time it is recognized that for the coarse filter approach to be effective representative examples of all community types need to be conserved. A state rank of S1 indicates that a community type is critically imperiled in the state due to its rarity, endemism, and/or threats. A rank of S5 indicates the community type is secure within the state. Similarly, a global rank of G1 indicates that a community type is critically imperiled on a range wide perspective due to its rarity, endemism, and/or threats. A global rank of G5 indicates the community type is secure on a range wide perspective.

Although the ranking methods are standardized, applying conservation ranks to communities is nonetheless a subjective process. The relative importance of and amount of information available for each of the ranking factors vary for each community. Ranks are assigned based on the best available information and are refined over time. The ranking procedure provides a reasonable estimate of the community rarity and threat, although some degree of error is inherent.

Definition of state and global ranks are as follows:

State Ranks

S1 = Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining acres) or because some factor(s) making it especially vulnerable to extirpation from the state.

S2 = Imperiled in the state because of rarity (6 to 20 occurrences or few remaining acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3 = Either very rare or local throughout the state or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extirpation from the state.

S4 = Widespread, abundant, and apparently secure, but with cause for long-term concern, perhaps because of rarity in parts of its range (usually more than 100 occurrences).

S5 = Demonstrably widespread, abundant, and secure, though it may be rare in parts of its range.

S#? = Small degree of uncertainty about the rank.

S#S# = Numeric range rank (e.g. S2S3), indicating a larger degree of uncertainty about the rank.

S? = Unranked, meaning that no evaluation has been attempted.

SU = Unrankable, meaning that an evaluation has been attempted, but information was insufficient to make a determination.

Global Ranks

G1 = Critically imperiled on a range wide basis because of extreme rarity (5 or fewer occurrences or very few remaining acres) or because some factor(s) making it especially vulnerable to extirpation.

G2 = Imperiled on a range wide basis because of rarity (6 to 20 occurrences or few remaining acres) or because of some factor(s) making it very vulnerable to extirpation.

G3 = Either very rare or local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extirpation.

G4 = Widespread, abundant, and apparently secure, but with cause for long-term concern, perhaps because of rarity in parts of its range (usually more than 100 occurrences).

G5 = Demonstrably widespread, abundant, and secure, though it may be rare in parts of its range.

G#? = Small degree of uncertainty about the rank.

G#G# = Numeric range rank (e.g. G2G3), indicating a larger degree of uncertainty about the rank.

G? = Unranked, meaning that no evaluation has been attempted.

GU = Unrankable, meaning that an evaluation has been attempted, but information was insufficient to make a determination.

GH = Historical, generally use for communities that were described in the last century or so, and have since been completely eliminated.

GM = Considered to be a semi-natural community, usually created by human activities, with no obvious natural analogue (e.g. old fields)

G#Q = Taxonomic questions occur with the type, and resolution of those questions would likely affect the global rank.

COMMUNITY DESCRIPTIONS

A description of each community type is included in this document. The community descriptions provide a varied account of community nomenclature, classification information, environmental descriptions, vegetation structure and composition, ranking information and other pertinent information. Specific fields included in the descriptions are as follows:

ELEMENT CODE – A unique ten digit code given to each community type in TNC’s global community classification.

GLOBAL NAME – Global community name based on the scientific names of the diagnostic plant species (dominant, differential, or characteristic).

OTHER NAME – Common synonyms for the community.

RANGE – Description of the community’s Nebraska distribution.

USFS ECOREGIONS – Ecoregions, as defined by Chapman et al. 2001), in which the community occurs in Nebraska.

ENVIRONMENTAL DESCRIPTIONS – Summary of environmental conditions known to be associated with the community.

COWARDWIN WETLAND SYSTEM – If the community is a wetland, the “System” from the USFWS Wetland Classification (Cowardin et al. 1979) is entered in this field.

MOST ABUNDANT SPECIES – The consistently most abundant plant species (in terms of percentage cover) among occurrences of the community.

DIAGNOSTIC SPECIES – Key plant species with high constancy that are used to classify the type. These may include dominant, differential, or characteristic species.

VEGETATION DESCRIPTION – A summary description of the vegetation of the community, including physiognomic structure (percent cover, height and dominant life forms) and species composition.

OTHER NOTEWORTHY SPECIES - A list of other noteworthy plant species (e.g. rare, endemic, or exotic) that occur in the community.

STATE RANK – Rank of the community’s relative rarity and endangerment in the state.

RANK JUSTIFICATION – Reasons for assigning the state rank.

GLOBAL RANK – Rank of the community’s relative rarity and endangerment throughout its range.

COMMENTS – Any other comments about the community, including important processes such as successional state, frequent disturbance types, similarity to other communities, and difficulties in classification.

EXEMPLARY SITES – Sites with the best known occurrences of the community.

REFERENCES – Citations of the primary references about this community.

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KEY TO THE TERRESTRIAL NATURAL COMMUNITIES OF NEBRASKA

The purpose of the key is to aid in the identification of community types observed in the field. Characteristics listed in the key to distinguish among communities include presence or absence of different vegetation strata, presence or absence of dominant or diagnostic species, topographic and geographic location, and other site characteristics. The key was developed based on the field experience of the authors.

GENERAL KEY – PHYSIOGNOMIC CLASS

1. Total vegetative cover >25%
 2. Cover of woody plants >3 m tall is > 25% (Forests and Woodlands).....**KEY I (p. 9)**
 2. Cover of woody plants >3 m tall is <25%
 3. Cover of woody plants <3 m tall is >25% (Shrublands).....**KEY II (p. 12)**
 3. Cover of woody plants <3 m tall is <25% (Herbaceous Communities).....**KEY III (p. 13)**
1. Total vegetative cover <25% (Sparsely Vegetated Communities).....**KEY IV (p. 23)**

KEY I - FOREST AND WOODLAND COMMUNITIES

1. Tallest stratum predominately of needle-leaf (coniferous) trees, some broadleaf trees may be present in the subcanopy.....**KEY IA**
1. Tallest stratum predominately of broadleaf (deciduous) trees, if conifers are present in tree canopy, their total cover <10%
 2. Tallest stratum predominately of cottonwoods (*Populus deltoides*) or willows (*Salix* spp.), riparian or in low wet ground in upland draws.....**KEY IB**
 2. Tallest stratum predominately of trees other than cottonwoods and willows, upland or riparian.....**KEY IC**

KEY IA – Coniferous Forest and Woodland Communities

1. Ponderosa pine (*Pinus ponderosa*) dominant in main canopy (total pine cover >25%)
 2. Junipers (*Juniperus scopulorum*, *J. virginiana*) forming a conspicuous subcanopy (total juniper cover>25%).....**Mixed Conifer Woodland, p. 58.**
 2. Junipers scattered or absent in subcanopy
 3. Herbaceous understory densely vegetated, predominately by graminoids typical of upland prairie (e.g. little bluestem [*Schizachyrium scoparium*], threadleaf sedge [*Carex filifolia*], needle-and-

thread [*Hesperostipa comata*], prairie sandreed [*Calamovilfa longifolia*). Overall cover of pine <50%.....**Ponderosa Pine Woodland, p. 54.**

3. Herbaceous understory sparsely to moderately vegetated (if densely vegetated, then Kentucky bluegrass [*Poa pratensis*] common), upland graminoids making up less than half the total herbaceous cover. Overall pine cover usually >50%
 4. Deciduous trees (usually green ash [*Fraxinus pennsylvanica*]) visible in subcanopy, and tall shrub layer of chokecherry (*Prunus virginiana*) and/or serviceberry (*Amelanchier* spp.) usually present. Prairie grasses uncommon or absent, overall pine cover usually >60%.....**Ponderosa Pine Forest, p. 27.**
 4. Deciduous trees usually absent, subcanopy poorly developed or absent. Prairie grasses visible with sedges (*Carex* spp.) and other shade-tolerant herbaceous species. Overall pine cover usually <60%.....**Ponderosa Pine Woodland, p. 54.**

1. Pines scattered or absent from main canopy (<25% cover), juniper dominant or about equaling pine in overall cover
 5. Juniper and pine about equally common, forming two distinct strata**Mixed Conifer Woodland, p. 58.**
 5. Juniper clearly dominant, pines scattered or absent (<10% cover).....**Juniper Woodland, p. 60.**

KEY IB – Deciduous Forest and Woodland Communities dominated by cottonwood or willow.

1. Cottonwoods dominating tree canopy, willows may be common in subcanopy or tall shrub layer.
 2. Subcanopy layer visibly denser than tall shrub layer
 3. Willows a conspicuous part of subcanopy or tall shrub layer, overall tree cover usually <60%.
 4. Shrub layer generally conspicuous and well developed, usually comprised of willows and other species, west 2/3 of state.....**Western Riparian Woodland, p. 45.**
 4. Shrub layer generally inconspicuous and poorly developed, if conspicuous, then predominately of willows, east fourth of state**Eastern Cottonwood-Willow Riparian Woodland, p. 50.**
 3. Willows uncommon and inconspicuous in subcanopy or shrub layer, overall tree cover >60%.....**Eastern Riparian Forest, p. 23.**
 2. Tall shrub layer visibly denser than subcanopy
 5. Roughleaf dogwood (*Cornus drummondii*) forming a conspicuous dense shrub layer, more common than all other shrub species combined, herbaceous layer often dominated by common scouringrush (*Equisetum hyemale*), Missouri River and tributaries in extreme east.....**Eastern Cottonwood-Dogwood Riparian Woodland, p. 48.**
 5. Roughleaf dogwood usually absent, if present, not more common than all other shrub species combined, herbaceous layer various, west 2/3.....**Western Riparian Woodland, p. 45.**
1. Willows dominating tree canopy

6. Tallest stratum 3-5 m tall, dominated by sandbar willow (*Salix exigua* var. *sericans*) or diamond willow (*Salix eriocephala*), uncommon
 7. Sandbar willow dominant, no shrub underlayer present. Mature stands of**Sandbar Willow Shrubland, p. 65.**
 7. Diamond willow dominant, a sparse shrub underlayer generally present.....**Diamond Willow Woodland, p. 52.**
6. Tallest stratum >5 m tall, dominated by peachleaf willow (*S. amygdaloides*), widespread
 8. Shrub layer generally conspicuous and well developed, usually comprised of willows and other species, west 2/3 of state.....**Western Riparian Woodland, p. 45.**
 8. Shrub layer generally inconspicuous and poorly developed, if conspicuous, then predominately of willows, east fourth of state.....**Eastern Cottonwood-Willow Riparian Woodland, p. 50.**

KEY IC. Deciduous Forest and Woodland communities dominated by trees other than cottonwoods and willows.

1. Paper birch (*Betula papyrifera*) present, sites associated with flowing springs in ravines along the Niobrara River in north-central Nebraska.....**Paper Birch Springbranch Canyon Forest, p. 33.**
1. Paper birch never present; widespread
 2. Oaks (*Quercus* spp.) dominant or co-dominant in tree canopy, communities generally of upland slopes, rarely of level floodplains
 3. Ironwood (*Ostrya virginiana*) common and conspicuous in subcanopy, sites situated on upland slopes along Missouri River and major tributaries and in the central Niobrara River valley.
 4. Bur oak (*Q. macrocarpa*) clearly the commonest (in many cases the only) oak present.
 5. Shagbark hickory (*Carya ovata*) generally present, often with scattered black oak (*Q. velutina*), sites usually on upper bluff slopes from the Omaha area southward.....**Oak – Hickory - Ironwood Forest, p. 29.**
 5. Shagbark hickory and black oak never present, sites often on lower and middle slopes from the Omaha area northward.....**Bur Oak – Basswood – Ironwood Forest, p. 31.**
 4. Bur oak not the commonest oak species present
 6. Chinkapin oak (*Q. muehlenbergii*) usually as common or more common than red oak (*Q. rubra*), shagbark hickory (*Carya ovata*) generally present, basswood (*Tilia americana*) not abundant, sites on upper to middle slopes from Otoe County southward.....**Oak – Hickory – Ironwood Forest, p. 29.**
 6. Chinkapin oak, if present, visibly less common than red oak, or if about equally common, then shagbark hickory absent and basswood abundant, sites on lower and middle slopes from Dakota County southward**Red Oak – Basswood – Ironwood Forest, p. 36.**

3. Ironwood absent, or if present, total cover <10% and site adjacent to an oak-dominated forest with abundant ironwood, widespread.
 7. Hackberry (*Celtis occidentalis*) co-dominant with bur oak in the tallest stratum, or dominating subcanopy, sites in level ground along permanent streams, wood nettle (*Laportea canadensis*) abundant in herbaceous layer, rare in southeast.....**Lowland Bur Oak Forest, p. 41.**
 7. Hackberry never co-dominant with oaks, if dominant tree of subcanopy, then sites on upland slopes, wood nettle not abundant in herbaceous layer, widespread.
 8. Total cover of deciduous trees usually <60%, prairie grasses such as big or little bluestem prominent in some part of the community, or if absent, eastern red cedar (*Juniperus virginiana*) forming a nearly impenetrable subcanopy.....**Oak Woodland, p. 66.**
 8. Total cover of deciduous trees > 60%, prairie grasses never present, and eastern red cedar, if present, generally without overlapping canopies.....**Upland Bur Oak Forest, p. 38.**
2. Oaks absent, or if present, never dominant; sites mostly in bottoms of draws, ravines, or at the base of bluffs (if oaks are present and sites are on upper slopes of bluffs adjacent to oak forest, refer to couplet 8 above).
 9. Sites generally associated with coniferous forest and woodland, deciduous tree cover <60%, Panhandle and possibly along Niobrara River.....**Green Ash – Elm Canyon Bottom Woodland, p. 56.**
 9. Sites generally associated with other upland deciduous forest or in floodplains of rivers, tree cover >60%, eastern half
 10. Sites in ravine bottoms and bases of oak-forested slopes, black walnut (*Juglans nigra*), hackberry (*Celtis occidentalis*) or Kentucky coffeetree (*Gymnocladus dioica*) dominating the canopy.....**Lowland Hackberry- Black Walnut Forest, p. 43.**
 10. Sites in floodplains of rivers, black walnut, hackberry and Kentucky coffeetree not as prevalent in canopy as green ash and elm.....**Eastern Riparian Forest, p. 23.**

KEY II – SHRUBLAND COMMUNITIES (NOTE: Shrubland communities are poorly studied in the Plains region. Many herbaceous communities may convert to shrubland in the absence of fire. The communities contained here are those which were likely present prior to European settlement, but this listing is far from complete. Herbaceous communities that commonly have local shrub patches of greater than 25% cover are accommodated in the key).

1. Short shrubs (usually <1 m tall) dominating canopy, namely wolfberry (*Symphoricarpos occidentalis*).....**Buckbrush Shrubland, p. 70.**
1. Short shrubs not dominant, though sometimes present in community
 2. Communities of wetland areas, herbaceous understory usually dominated by hydrophytes.
 3. Willows (*Salix* spp.) clearly the dominant shrub

4. Sandbar willow (*Salix exigua* var. *sericans*) dominant, community temporarily to seasonally flooded, soils sand, silt or clay, widespread
.....**Sandbar Willow Shrubland, p. 65.**
4. Meadow willow (*Salix petiolaris*) more common than sandbar willow, community saturated, soils peat, Sandhills.....**Sandhills Fen, p. 79.**
3. Willows, if present, less common than roughleaf dogwood (*Cornus drummondii*) or false indigobush (*Amorpha fruticosa*)
 5. Roughleaf dogwood generally more common than false-indigobush.....**Riparian Dogwood False-Indigobush Shrubland, p. 67.**
 5. Roughleaf dogwood absent or clearly less common than false-indigobush
 6. Sites temporarily to seasonally flooded.....**Riparian Dogwood-False-Indigobush Shrubland, p. 67.**
 6. Sites saturated.....**Marsh Seep, p.73.**
2. Communities of uplands and well-drained floodplains, hydrophytes never present.
 7. Communities of the Nebraska Panhandle and far southwest (ecoregions 25 & 43), roughleaf dogwood (*Cornus drummondii*) or smooth sumac (*Rhus glabra*) never present.
 8. Sites usually on steep slopes associated with coniferous woodland, dominated by mountain mahogany (*Cercocarpus montanus*).....**Mountain Mahogany Shrubland, p. 68.**
 8. Sites usually on level to rolling ground, never associated with coniferous woodland, dominated by sagebrush (*Artemisia* spp.)
 9. Silver sagebrush (*Artemisia cana*) dominant, sites on silty or clay soils, northern Panhandle.....**Silver Sagebrush Shrub Prairie, p. 137.**
 9. Sandsage (*Artemisia filifolia*) dominant, sites on sandy soils, south 2/3 Panhandle and southwest.....**Sandsage Prairie, p. 117.**
 7. Communities of eastern half of Nebraska, roughleaf dogwood and/or smooth sumac dominant.....**Sumac-Dogwood Shrubland, p. 71.**

KEY III – HERBACEOUS COMMUNITIES

1. Site dominated by submersed and/or floating-leaved aquatic vegetation
 2. Sites seasonally flooded, drying out by mid-summer, water starworts (*Callitriche* spp.) or waterthread pondweed (*Potamogeton diversifolius*) dominant.....**Spikerush Vernal Pool, p. 110.**
 2. Sites permanently flooded, water starworts or waterthread pondweed not dominant
 3. Submersed broadleaf (>3mm wide) pondweeds (*Potamogeton* spp.) among the dominant species; soil usually covered by a thick layer of organic matter; lakes in the Sandhills
.....**Sandhills Aquatic Wetland, p. 83.**

3. Submersed broadleaf pondweeds usually absent; soil of bare sand or mud without a distinct layer of organic matter; statewide.....**Pondweed Aquatic Wetland, p. 81.**

1. Site not dominated by submersed aquatics

4. Communities of eastern Nebraska (east of 100° longitude).....**KEY IIIA**

4. Communities of western Nebraska (west of 100° longitude).....**KEY IIIB**

KEY IIIA – Terrestrial and emergent aquatic communities of eastern Nebraska

1. Sites permanently saturated or flooded through most of the growing season, dominated at least in part by tall, coarse perennial, emergent hydrophytes such as bulrushes (*Schoenoplectus* spp.) and cattails (*Typha* spp.).....**KEY IIIA1**

1. Sites never saturated or flooded, except temporarily flooded early in the season or following heavy rains (sometimes flooded seasonally in exceptionally wet years)

2. Sites dominated by annual forbs and often seedlings of perennial plants, usually flooded early in the season and drying out by mid-summer

3. Sites present in and along margins of river channels; tree seedlings frequently abundant.....**Sandbar/Mudflat, p. 154.**

3. Sites not in river channels, but often in floodplains and on terraces

4. Sites usually with salt crusts at the surface; dominated by annual halophytes such as saltwort (*Salicornia rubra*) or seablite (*Suaeda calceoliformis*)**Eastern Saline Meadow, p. 98.**

4. Salt crusts absent; sites dominated by annual hydrophytes.....**Playa Wetland, p. 107.**

2. Sites dominated by perennial graminoids and/or forbs; hydrologic regime various

5. Sites moderately to strongly alkaline and dominated in part by inland saltgrass (*Distichlis spicata*), sites restricted to Lancaster and Saunders Counties.....**Eastern Saline Meadow, p. 98.**

5. Sites neutral to slightly alkaline; inland saltgrass uncommon or absent

6. Sites dominated by hydrophytic graminoids including sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), rushes (*Juncus* spp.) and prairie cordgrass (*Spartina pectinata*).....**KEY IIIA2**

6. Sites not dominated by hydrophytic graminoids (although these may be present)

7. Shrubs and/or perennial forbs visually co-dominant with graminoids, ledge spike-moss (*Selaginella rupestris*) often abundant

8. Prairie sandreed (*Calamovilfa longifolia*) usually present, Niobrara River drainage in north...**Northern Sand/Gravel Prairie, p. 153.**

8. Prairie sandreed absent; Little Blue and Republican River drainages in south.....**Southern Sand/Gravel Mixed-grass Prairie, p. 133.**

7. Perennial graminoids clearly dominant

9. Site dominated by big bluestem (*Andropogon gerardii*) and often also Indian grass (*Sorghastrum nutans*).....**KEY IIIA3**

9. Sites dominated by grasses other than big bluestem or Indiangrass.

10. Site dominated by mid and short grasses <1 m tall
.....**KEY IIIA4**

10. Site dominated by tall grasses or by tall grasses and AND mid and short grasses <1 m tall.....**KEY IIIA5**

KEY IIIA1. Marshes, seeps, and fens

1. Sites saturated by groundwater seepage, generally not flooded, except near flowing springs (fens and seeps)
 2. Sites typified by flowing groundwater (springs), soils often poorly formed, primarily mineral., usually of sand or silt.....**Spring Seep, p. 75.**
 2. Sites typified by non-flowing water, for the most part, soils highly organic peats and mucks
 3. Peat layer generally >30 cm deep, prairie star sedge (*Carex interior*) often dominant, sites rare in eastern Sandhills and southeast (fens)
 4. Sites located in the Sandhills, bog buckbean (*Menyanthes trifoliata*) and cottongrass (*Eriophorum* spp.) present.....**Sandhills Fen, p. 79.**
 4. Sites located in southeast Nebraska, neither bog buckbean nor cottongrass present.....**Prairie Fen, p. 77.**
 3. Peat layer generally <30 cm thick, prairie star sedge not dominant, sites widespread.....**Marsh Seep, p. 73.**
1. Sites flooded through most of the growing season, except in very dry years (marshes)
 5. Sites moderately to strongly saline or alkaline; three-square bulrush (*Schoenoplectus pungens*) and/or saltmarsh bulrush (*Bolboschoenus maritimus*) usually among the dominants, restricted to the Salt Creek drainage in Lancaster and Saunders Counties.....**Eastern Saline Marsh, p. 92.**
 5. Sites neutral to slightly alkaline; broadleaf cattail (*Typha latifolia*) among the dominants
 6. Hardstem bulrush (*Schoenoplectus acutus*) or common reed (*Phragmites australis*) dominant and/or co-dominant with broadleaf cattail; Sandhills and valleys of rivers draining the Sandhills.....**Sandhills Freshwater Marsh, p. 88.**
 6. Hardstem bulrush or common reed sometimes present in patches but never dominant; widespread
 7. Broadleaf cattail usually the dominant species; sites often in floodplains
.....**Freshwater Marsh, p. 95.**
 7. Broadleaf cattail often co-dominant with river bulrush (*Bolboschoenus fluviatilis*), sites in shallow depressions on level upland plains.....**Pond Marsh, p. 85.**

KEY IIIA2. Temporarily flooded non-saline wetlands dominated by perennials

1. Sites restricted to river and stream channels and margins; willow saplings sometimes common
.....**Perennial Sandbar, p. 105.**
1. Sites not restricted to river channels, but frequently in floodplains and on terraces; willow saplings uncommon or absent
 2. Grasses, especially prairie cordgrass (*Spartina pectinata*) about equally common as sedges
 3. Northern reedgrass (*Calamagrostis stricta*) usually present; Platte River valley northward
.....**Northern Cordgrass Wet Prairie, p. 103.**
 3. Northern reedgrass absent; Missouri River floodplain and southeastern Nebraska.....**Eastern Cordgrass Wet Prairie, p. 97.**
 2. Grasses less common than sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), and bulrushes (*Schoenoplectus* spp.)
 4. Sites generally in small temporarily-flooded depressions, dominated by common spikerush (*Eleocharis palustris*)**Spikerush Vernal Pool, p. 110.**
 4. Sites dominated by sedges (*Carex* spp.) and/ or three-square bulrush (*Schoenoplectus pungens*)
 5. Community occurring as strips or bands along banks and in channels of small streams, Nebraska sedge (*Carex nebrascensis*) often common, western, but possible along Niobrara River.....**Western Streamside Wet Meadow, p. 109.**
 5. Community occurring as broad level areas in valley bottoms in vicinity of low prairie and marshes, Nebraska sedge rarely present, widespread
 6. Sawbeak sedge (*Carex stipata*) and fox sedge (*C. vulpinoidea*) among the dominant species, Crawe's sedge (*C. crawei*) and rigid sedge (*C. tetanica*) absent; leafy bulrushes (*Scirpus pallidus* and others) commonly present and extensive; eastern and southeastern Nebraska
.....**Eastern Sedge Wet Meadow, p. 100.**
 6. Sawbeak and fox sedges often present, but not dominant, Crawe's and rigid sedge usually present; leafy bulrushes present but seldom extensive; Sandhills and vicinity in northern Nebraska
.....**Northern Sedge Wet Meadow, p. 101.**

KEY IIIA3. Big bluestem dominated prairie.

1. Little bluestem (*Schizachyrium scoparium*) conspicuous and common among tall grasses.
 2. Sites on steep slopes or on sandy soils, mostly east of 98° longitude, if on level ground, then little bluestem much less common on adjacent slopes.....**Tallgrass prairie, p. 125.**
 2. Sites on level ground and in silty soils, mostly west of 98° longitude, little bluestem much more common on adjacent slopes.....**Loess Mixed-grass Prairie, p. 144.**
1. Little bluestem not conspicuous

3. Hydrophytic grasses (especially prairie cordgrass [*Spartina pectinata*]) and sedges [*Carex* spp.] conspicuous and common.....**Wet-mesic Tallgrass Prairie, p. 128.**
3. Hydrophytes uncommon or absent.....**Tallgrass Prairie, p 125.**

KEY IIIA4. Prairie dominated by mid and/or short grasses

1. Western wheatgrass (*Elymus smithii*) common and conspicuous, communities of level ground, soils usually fine silts or loams
 2. Sites bordering wetland depressions, soils with an underlying clay pan, buffalograss (*Buchloë dactyloides*) often present, mostly south of Platte River.....**Wheatgrass Playa Grassland, p. 114.**
 2. Sites in floodplains, soils without an underlying clay pan, buffalograss seldom present, Niobrara River drainage.....**Western Floodplain Terrace Grassland, p. 135.**
1. Western wheatgrass not common, communities of rolling ground; soils usually sandy.
 3. Threadleaf sedge (*Carex filifolia*) present, Niobrara River drainage
.....**Western Mixed-grass Prairie, p. 146.**
 3. Threadleaf sedge never present, Missouri River floodplain
.....**Missouri River Valley Dune Grassland, p. 130.**

KEY IIIA5. Prairie dominated by tall-grasses other than big bluestem, or tall and mid or short grasses.

1. Prairie sandreed (*Calamovilfa longifolia*) common or dominant, sand bluestem (*Andropogon hallii*) frequently conspicuous
 2. Sites associated with escarpments, short-grass layer predominately of blue grama (*Bouteloua gracilis*), Niobrara River drainage **Western Sandy Slope Prairie, p. 150.**
 2. Sites associated with sand dunes, short-grass layer predominately of hairy grama (*Bouteloua hirsuta*), Sandhills.....**Sandhills Dune Prairie, p. 119.**
1. Prairie sandreed not common, sand bluestem usually absent
 3. Prairie dropseed (*Sporobolus heterolepis*) common
 4. Big bluestem conspicuously more common than little bluestem, southeast
.....**Tallgrass Prairie, p. 125.**
 4. Big bluestem conspicuously less common than little bluestem, Sandhills and northeast
.....**Dry-Mesic Sand Prairie, p. 123.**
 3. Prairie dropseed never present.
 5. Sites associated with sandy soils formed in eolian sand, level to gently rolling ground.

- 6. Sites associated with the floodplain of Missouri River and possibly other tributaries in east, Canada wildrye (*Elymus canadensis*) often conspicuous and scattered cottonwoods (*Populus deltoides*) often present.
 - 7. Rolling dunes present, sand dropseed (*Sporobolus cryptandrus*) common.....**Missouri River Valley Dune Grassland, p. 130.**
 - 7. Rolling dunes not present, sites on level ground, sand dropseed not common.....**Missouri River Floodplain Terrace Grassland, p. 132.**
- 6. Sites associated with Sandhills and periphery.
 - 8. Porcupine grass (*Hesperostipa spartea*) often present and more common than needle-and-thread (*H. comata*), sites generally associated with interdunal wetlands, frequent.....**Dry-Mesic Sand Prairie, p. 123.**
 - 8. Porcupine grass less common or equally as common as needle-and-thread sites not associated with wetlands, uncommon, mostly western**Sandhills Dry Valley Prairie, p. 121.**
- 5. Sites associated with silty soils formed in loess, usually on moderate to steep slopes
 - 9. Sites associated with loess bluffs along the Missouri River in northeastern Nebraska**Loess Bluff Prairie, p. 142.**
 - 9. Sites associated with loess hills and dissected loess hills in central Nebraska.....**Loess Mixed-grass Prairie, p. 144.**

KEY IIIB – Terrestrial and emergent aquatic communities of western Nebraska

- 1. Sites permanently saturated or flooded through most of the growing season, dominated at least in part by tall, coarse perennial, emergent hydrophytes such as bulrushes (*Schoenoplectus* spp.) and cattails (*Typha* spp.).....**KEY IIIB1**
- 1. Sites never saturated or flooded, except temporarily flooded early in the season or following heavy rains (sometimes flooded seasonally in exceptionally wet years)
 - 2. Sites dominated by annual forbs and often seedlings of perennial plants, usually flooded early in the season and drying out by mid-summer
 - 3. Sites in depressions in uplands; soils with an underlying impermeable clay pan**Playa Wetland, p. 107.**
 - 3. Sites on level ground associated with rivers or canyon bottoms, soils highly permeable
 - 4. Sites in river channels, dominated by hydrophytic annuals, tree seedlings often abundant.....**Sandbar/Mudflat, p. 154.**
 - 4. Sites on floodplain terraces or in canyon bottoms, dominated by annuals typical of uplands, tree seedlings seldom abundant.....**Western Gravel Flats, p. 156.**
 - 2. Sites dominated by perennial graminoids and/or forbs; hydrologic regime various

5. Sites moderately to strongly alkaline and dominated in part by inland saltgrass (*Distichlis spicata*)
 6. Salt crusts generally present, at least along small depressions, these usually containing seablite (*Suaeda calceoliformis*); inland saltgrass usually dominant through most of site**Western Alkaline Meadow, p. 112.**
 6. Salt crusts usually absent; inland saltgrass at most locally common as patches
 7. Greasewood (*Sarcobatus vermiculatus*) and/or spine-fruit prickly pear (*Opuntia polyacantha*) present and common, extreme northwest**Greasewood Shrub Prairie, p. 139.**
 7. Greasewood and spine-fruit prickly pear mostly absent or uncommon; widespread**Western Floodplain Terrace Grassland, p. 135.**
5. Sites neutral to slightly alkaline; inland saltgrass uncommon or absent
 8. Sites dominated by hydrophytic graminoids including sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), rushes (*Juncus* spp.) and prairie cordgrass (*Spartina pectinata*).....**KEY IIIB2**
 8. Sites not dominated by hydrophytic graminoids (although these may be present)
 9. Perennial shrubs and forbs visually co-dominant with graminoids**KEY IIIB3**
 9. Perennial graminoids clearly dominant
 10. Site dominated by big bluestem (*Andropogon gerardii*) and often also Indian grass (*Sorghastrum nutans*)
 11. Sites usually found in loamy soils in large river valleys.....**Tallgrass prairie, p. 125.**
 11. Sites usually on silty soils associated with loess bluffs.....**Loess Mixed-grass Prairie, p. 144.**
 10. Site dominated by grasses other than big bluestem.
 12. Site dominated by grasses <1 m tall....**KEY IIIB4**
 12. Site co-dominated by grasses >1m tall **AND** mid and short grasses <1 m tall.....**KEY IIIB5**

KEY IIIB1. Marshes, seeps, and fens of western Nebraska

1. Sites saturated by groundwater seepage, generally not flooded, except near flowing springs (fens and seeps)
 2. Sites typified by flowing groundwater (springs), soils often poorly formed, primarily mineral., usually of sand or silt.....**Spring Seep, p. 75.**
 2. Sites typified by non-flowing water, for the most part, soils highly organic peats and mucks

- 3. Peat layer usually >30 cm thick, often much thicker, cottongrass (*Eriophorum* spp.) usually present.....**Sandhills Fen, p. 79.**
- 3. Peat layer usually <30 cm thick, cottongrass never present,.....**Marsh Seep, p. 73.**
- 1. Sites flooded through most of the growing season, except in very dry years (marshes)
 - 5. Sites moderately to strongly saline or alkaline; three-square bulrush (*Schoenoplectus pungens*) and/or alkali bulrush (*Bolboschoenus maritimus*) usually among the dominants
.....**Western Alkaline Marsh, p. 90.**
 - 5. Sites neutral to slightly alkaline; broadleaf cattail (*Typha latifolia*) among the dominants
 - 6. Hardstem bulrush (*Schoenoplectus acutus*) or common reed (*Phragmites australis*) dominant and/or co-dominant with broadleaf cattail; Sandhills and valleys of rivers draining the Sandhills.....**Sandhills Freshwater Marsh, p. 88.**
 - 6. Hardstem bulrush or common reed sometimes present in patches but never dominant; widespread**Freshwater Marsh, p. 95.**

KEY IIIB2. Temporarily-flooded wetlands dominated by perennials

- 1. Sites restricted to river and stream channels and margins; sandbar willow (*Salix exigua* var. *sericans*) saplings present in variable abundance**Perennial Sandbar, p. 105.**
- 1. Sites not restricted to river channels, but frequently in floodplains and on terraces; sandbar willow saplings uncommon or absent
 - 2. Hydrophytic grasses (especially *Spartina pectinata*) about equally common as sedges
.....**Northern Cordgrass Wet Prairie, p. 103.**
 - 2. Hydrophytic grasses less common than sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), and bulrushes (*Schoenoplectus* spp.)
 - 3. Sites dominated by common spikerush (*Eleocharis palustris*)
..... **Spikerush Vernal Pool, p. 110.**
 - 3. Sites dominated by sedges (*Carex* spp.) and/ or three-square bulrush (*Schoenoplectus pungens*)
 - 4 Community occurring as strips or bands along banks and in channels of small streams
.....**Western Streamside Wet Meadow, p. 109.**
 - 4. Community occurring as broad level areas in valley bottoms in vicinity of low prairie and marshes.....**Northern Sedge Wet Meadow, p. 101.**

KEY IIIB3. Terrestrial communities with shrubs and/or forbs co-dominant with grasses

- 1. Soils shallow silt, sand, or clay associated with outcrops of sandstone or siltstone; shrubs conspicuous
 - 2. Silver sagebrush (*Artemisia cana*), saltbush (*Atriplex canescens*) or rubber rabbitbrush (*Ericameria nauseosa*) the conspicuous shrub species; usually associated with siltstone and clay buttes and washes
.....**Badlands, p. 161.**

2. Skunkbrush sumac (*Rhus aromatica*) among the conspicuous shrub species; usually associated with sandstone and siltstone escarpments.....**Rock Outcrop, p. 159.**
1. Soils sands and gravels associated with alluvium or glacial till; shrubs usually not conspicuous
 3. Sites associated with floodplains and terraces; ledge spike-moss (*Selaginella rupestris*) seldom common.....**Western Gravel Flats, p. 156.**
 3. Sites associated with uplands; ledge spike-moss often abundant ...**Northern Sand/Gravel Prairie, p. 153.**

KEY IIB4. Short and mid-grass prairie

1. Site dominated by short (<0.5m) grasses
 2. Threadleaf sedge (*Carex filifolia*) dominant or co-dominant**Western Mixed-grass Prairie, p. 146.**
 2. Threadleaf sedge uncommon or absent.....**Short-grass Prairie, p. 141.**
1. Site dominated by mid grasses (0.5-1 m tall) and short grasses; western wheatgrass (*Elymus smithii*) usually dominant or co-dominant
 3. Silver sagebrush (*Artemisia cana*) and/or greasewood (*Sarcobatus vermiculatus*) usually present and conspicuous, communities of stream terraces in extreme northwest Nebraska
 4. Greasewood present, equally common or more common than silver sagebrush; usually on higher terraces and uplands above streams**Greasewood Shrub Prairie, p. 139.**
 4. Greasewood absent or much less common than silver sagebrush; lower stream terraces
 5. Western wheatgrass dominant or co-dominant
 6. Needle-and-thread (*Hesperostipa comata*) and/or green needlegrass (*Nassella viridula*) co-dominant with western wheatgrass; usually on terraces directly above floodplain.....**Silver Sagebrush Shrub Prairie, p. 137.**
 6. Needle-and-thread uncommon or absent; usually in floodplains**Western Floodplain Terrace Grassland, p. 135.**
 5. Western wheatgrass not dominant; sideoats grama (*Bouteloua curtipendula*) or little bluestem (*Schizachyrium scoparium*) usually co-dominant**Silver Sagebrush Shrub Prairie, p. 137.**
 3. Silver sagebrush and greasewood absent
 7. Sites in floodplains or terraces of permanent rivers or streams; trees sometimes present**go back to couplet 6**
 7. Sites in uplands; trees generally absent
 8. Threadleaf sedge (*Carex filifolia*) common and conspicuous
 9. Soils mostly sandy loam and silt loam, threadleaf sedge usually dominant or co-dominant; needle-and-thread (*Hesperostipa comata*) common (except where heavily grazed); widespread.....**Western Mixed-grass Prairie, p. 146.**

9. Soils mostly sandy loam and silt loam, threadleaf sedge usually dominant or co-dominant; needle-and-thread (*Hesperostipa comata*) common (except where heavily grazed); widespread.....**Western Mixed-grass Prairie, p. 146.**

9. Soils mostly clay loam or clay; threadleaf sedge co-dominant locally (particularly atop ungrazed ridges and buttes); needle-and-thread uncommon; mostly extreme northwest**Northwestern Mixed-grass Prairie, p. 148.**

8. Threadleaf sedge uncommon or absent

10. Sites often flooded temporarily in early spring or following heavy rains; frequently with an underlying clay pan**Wheatgrass Playa Grassland, p. 114.**

10. Sites rarely if ever flooded; soils without underlying clay pan (though often high in clay content).....**Northwestern Mixed-grass Prairie, p. 148.**

KEY IIIB5. Mixed-grass Prairie

1. Sandsage (*Artemisia filifolia*) common and conspicuous.....**Sandsage Prairie, p. 117.**

1. Sandsage uncommon or absent; sites various

2. Sites associated with eolian or colluvial sands or sandy loams; prairie sandreed (*Calamovilfa longifolia*) common and conspicuous

3. Sites associated with escarpments, formed in colluvial sands from eroded sandstone; prairie sandreed frequently dominant or co-dominant with needle-and-thread (*Hesperostipa comata*)

4. Short-grass layer predominately of sun sedge (*Carex heliophila*), big bluestem (*Andropogon gerardii*) frequently present; Pine Ridge**Pine Ridge Sandy Slope Prairie, p. 152.**

4. Short-grass layer predominately of blue grama (*Bouteloua gracilis*), big bluestem absent; widespread**Western Sandy Slope Prairie, p. 150.**

3. Sites associated with dunes formed from eolian sand (or interdunal depressions); sand bluestem (*Andropogon hallii*), hairy grama (*Bouteloua hirsuta*), sun sedge (*Carex heliophila*), or switchgrass (*Panicum virgatum*) common associated species

5. Threadleaf sedge (*Carex filifolia*) common and conspicuous, mostly outside the Sandhills (except along Niobrara River).....**Western Mixed-grass Prairie, p. 146.**

5. Threadleaf sedge absent, sites in Sandhills and outliers

6. Porcupine grass (*Hesperostipa spartea*) usually conspicuous and common, eastern part of Sandhills.....**Dry-Mesic Sand Prairie, p.123.**

6. Porcupine grass uncommon to absent

7. Sites associated with upland dunes; sand bluestem often conspicuous.....**Sandhills Dune Prairie, p. 119.**

7. Sites associated with interdunal valleys; switchgrass often conspicuous.....**Sandhills Dry Valley Prairie, p. 121.**

2. Sites associated with loess; soils silt loams; prairie sandreed uncommon; big bluestem (*Andropogon gerardii*) frequently present.....**Loess Mixed-grass Prairie, p. 144.**

KEY IV SPARSELY-VEGETATED COMMUNITIES

1. Sites associated with eroded sandstone or siltstone bluffs or clay buttes
 2. Slope of site >60% on average.....**Dry Cliff, p. 158.**
 2. Slope of site <60% (some areas within sites may be greater)
 3. Vegetation predominately of perennial forbs; sandstone or siltstone outcrops
.....**Rock Outcrop, p. 159.**
 3. Vegetation predominately of shrubs and annual forbs, or these equally conspicuous as perennial forbs; eroded siltstone outcrops and clay buttes**Badlands, p. 161.**
1. Sites associated with streams and terraces
 4. Sites dominated by hydrophytic annuals; river channels and shores.....**Sandbar/Mudflat, p. 154.**
 4. Sites dominated by xerophytic annuals; floodplain terraces and canyon bottoms
.....**Western Gravel Flats, p. 156.**

WETLAND FORESTS

EASTERN RIPARIAN FOREST

ELEMENT CODE: CEGl002014 (also CEGl000658)

GLOBAL NAME: *Fraxinus pennsylvanica* - *Ulmus* spp. - *Celtis occidentalis* Forest

OTHER NAMES: Green Ash – Elm – Hackberry Forest; Eastern Floodplain Woodland, Eastern Lowland Forest, in part (Steinauer & Rolfsmeier, 2000); Mixed-hardwood shrub community (Currier, 1982).

RANGE: This community occurs in the floodplains of rivers and larger streams in the eastern fourth of the State and may extend slightly farther westward into central Nebraska along the Platte, Loup and Republican River systems.

ECOREGIONS: 27a, 27b? 27e?, 27f, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on floodplains and lower terraces of rivers and streams and on higher islands within the channels of large rivers which are occasionally to infrequently flooded. Soils are moderately well drained to poorly drained sands, sandy loams, loams, and silt loams formed in sand, silt, or clay alluvium.

COWARDIN WETLAND SYSTEM: Palustrine forested, temporarily to intermittently flooded.

MOST ABUNDANT SPECIES:

Tree canopy: Plains cottonwood (*Populus deltoides*)

Subcanopy: silver maple (*Acer saccharinum*), box-elder (*A. negundo*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), honey locust (*Gleditsia triacanthos*), white mulberry (*MORUS ALBA*), American elm (*Ulmus americana*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*)

Short shrub: Missouri gooseberry (*Ribes missouriense*), coralberry (*Symphoricarpos orbiculatus*).

Vine: Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), riverbank grape (*Vitis riparia*)

Herbaceous: white snakeroot (*Ageratina altissima*), sedges (*Carex* spp.), Virginia wildrye (*Elymus virginicus*), nodding fescue (*Festuca subverticillata*), annual bedstraw (*Galium aparine*), sweet-scented bedstraw (*Galium triflorum*), white avens (*Geum canadense*), wood nettle (*Laportea canadensis*), whitegrass (*Leersia virginica*), muhlys (*Muhlenbergia* spp.), aniseroot (*Osmorhiza longistylis*), Virginia creeper (*Parthenocissus quinquefolia*), goldenglow (*Rudbeckia laciniata*), Canada sanicle (*Sanicula canadensis*), clustered sanicle (*Sanicula odorata*), starry false Solomon's seal (*Smilacina stellata*), goldenrods (*Solidago* spp.), eastern poison ivy (*Toxicodendron radicans*), stinging nettle (*Urtica dioica*), violets (*Viola* spp.).

DIAGNOSTIC SPECIES: *Acer saccharinum*, *Cornus drummondii*, *Fraxinus pennsylvanica*, *Populus deltoides*, *Ulmus americana*

VEGETATION DESCRIPTION: This community typically has a sparse to moderate tall canopy of cottonwoods 10–30 m tall, though in some mature stands these may be nearly absent. The subcanopy is generally dense and 5-15 m tall (or taller in mature stands) and contains several species, most commonly green ash and American elm. Other trees which may be common include silver maple, box-elder, hackberry, honey locust, red mulberry (*Morus rubra*) and slippery elm (*Ulmus rubra*). The introduced white mulberry is frequently present and sometimes common in places. Eastern red cedar (*Juniperus virginiana*) is common in some sites in central Nebraska. The shrub layer is frequently well-developed though not as extensive as in some floodplain woodland communities. Roughleaf dogwood is usually the common tall shrub, and a short shrub layer of coralberry and Missouri gooseberry is frequently present. Exotic shrubs including common buckthorn (*Rhamnus cathartica*) and multiflora rose (*Rosa multiflora*) may invade and overtake some sites. The herbaceous layer is usually lush with numerous woodland graminoids and forbs including nodding fescue, wood nettle, sanicles, and bedstraws. Disturbed sites may be invaded by poison hemlock (*Conium maculatum*), dame's rocket (*Hesperis matronalis*) and garlic mustard (*Alliaria petiolata*), especially eastward. Species diversity varies from low to moderately high. Two subtypes can be recognized:

- a) American elm subtype is the most common and widespread and typically occurs in sites that are infrequently flooded. American elm is usually the dominant subcanopy tree, frequently occurring with scattered green ash and hackberry, and often the introduced white mulberry. Farther east, silver maple, honey locust, and red mulberry (*Morus rubra*) may be present, while green ash may be more common westward. A tall shrub layer of scattered roughleaf dogwood is present, with false indigobush (*Amorpha fruticosa*) sometimes also present westward. Coralberry is frequently the common short shrub, though it tends to be absent farther west. Woody vines (especially eastern poison ivy and Virginia creeper) are often common, and may climb into the tree canopy. The herbaceous layer is frequently lush with the woodland species described above. Species diversity is moderate to relatively high.
- b) Silver maple subtype is known from the east fifth of the state and is especially common along the Missouri and lower Platte. It tends to occur in lower ground that is frequently flooded in early spring. It is distinguishable by a fairly tall subcanopy predominately of silver maple, often with scattered green ash and elms. The shrub layer is similar to the cottonwood-elm subtype, but the herbaceous layer is generally not as rich and often has a larger sedge component and fewer forbs. Species diversity is moderate to high. Species diversity is low to moderate, though it may be relatively high in some mature stands.

OTHER NOTEWORTHY SPECIES: Green dragon (*Arisaema dracontium*), hop sedge (*Carex lupulina*), eastern star sedge (*Carex radiata*), mullein foxglove (*Dasistoma macrophylla*) and bottle gentian (*Gentiana andrewsii*) are found sparingly in this community along the lower Platte River. Rough avens (*Geum laciniatum*) is frequent in this community along the Loup and Platte Rivers, and sycamore (*Platanus occidentalis*) is sometimes present along the Missouri River south of Omaha. Northern green orchid (*Platanthera aquilonis*) was collected once from a site along the Middle Loup River.

STATE RANK: S3

RANK JUSTIFICATION: This community is fairly widespread in eastern Nebraska, though many sites are degraded by heavy grazing and invasion by white mulberry. Spread of garlic mustard along the Missouri and Platte Rivers poses a potential threat to other sites. Eastern red cedar (*Juniperus virginiana*) has invaded many sites in central Nebraska, resulting in reduced species diversity.

GLOBAL RANK: G3G5

COMMENTS: Eastern riparian forest is probably the most common wooded riparian community in the eastern fourth of the state, particularly southward. As here defined, this community combines the Eastern Floodplain Woodland and most of the Eastern Lowland Forest communities of the 2000 classification. The only difference between these communities is density of the cottonwood layer. This community may occur with several riparian woodland and shrubland types but is generally distinct.

A couple of distinctive silver maple dominated phases of this community have been recorded in extreme eastern Nebraska. One seasonally-flooded forest along the Big Nemaha River in Richardson County is dominated by a fifty foot canopy of silver maple with a few taller cottonwoods on sandy ridges and a moderately dense herbaceous layer dominated by forest plants such as wood nettle, nodding fescue, Virginia wildrye and annual bedstraw. This type is strikingly similar to some silver maple dominated forests to the east of our area. A similar site occurs in lower channels within typical riparian forest along the Platte River in Douglas County. It has a canopy of silver maple and a tall subcanopy of green ash and few other trees. Dogwoods are moderately dense, and the understory is primarily dominated by sedges (*C. grisea*, *C. lupulina*, *C. tenera*, *C. tribuloides*) and eastern poison ivy.

Two other mature phases of riparian forest types have been observed in extreme eastern Nebraska occurring as patches within more typical eastern riparian forest. Vaubel (1975) reported a sycamore (*Platanus occidentalis*) –elm dominated community from along the Missouri River in southeast Nebraska, and small occurrences have been observed at Fontenelle Forest in Sarpy County. A hackberry-basswood (*Tilia americana*) type has been observed in mature eastern riparian forest along the lower Platte at Two Rivers Wildlife Management Area.

EXEMPLARY SITES: Two Rivers State Recreation Area and Wildlife Management Area in Douglas County.

REFERENCES:

- Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames: 317pp.
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- Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. Transactions of the Nebraska Academy of Sciences 16:91–113.
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UPLAND FORESTS

PONDEROSA PINE FOREST

ELEMENT CODE: CEG000192

GLOBAL NAME: *Pinus ponderosa* / *Prunus virginiana* Forest

OTHER NAMES: Upland pine forest community (Kantak, 1995); Ponderosa pine/chokecherry forest

RANGE: This community occurs extensively on the Pine Ridge escarpment in Dawes, Sheridan and Sioux counties in northwest Nebraska, and locally in the Niobrara River valley in Brown and Cherry counties, and in the Wildcat Hills of Banner and Scotts Bluff County.

ECOREGIONS: 25a, 25f, 43r

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep (5-40%) slopes on mostly north and east exposures of escarpments. Soils are well-drained sandy loams formed in colluvium and are often associated with sandstone outcrops.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: Ponderosa pine (*Pinus ponderosa*)

Tree subcanopy: green ash (*Fraxinus pennsylvanica*)

Tall shrub: Saskatoon serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*)

Short shrub: Oregon grape (*Berberis repens*), dwarf juniper (*Juniperus communis*), fragrant sumac (*Rhus aromatica*), wolfberry (*Symphoricarpos occidentalis*), western poison ivy (*Toxicodendron rydbergii*)

Herbaceous: spreading dogbane (*Apocynum androsaemifolium*), common wood sedge (*Carex blanda*), sun sedge (*C. heliophila*), Ross' sedge (*C. rossii*), Rocky Mountain sedge (*C. saximontana*), brittle bladder fern (*Cystopteris fragilis*), hairy wildrye (*Elymus villosus*), slender wildrye (*Elymus trachycaulus*), starry false Solomon's-seal (*Smilacina stellata*), littleseed ricegrass (*Piptatherum micranthum*), Kentucky bluegrass (*POA PRATENSIS*), smooth blue aster (*Symphyotrichum laeve*)

DIAGNOSTIC SPECIES: *Amelanchier alnifolia*, *Berberis repens*, *Juniperus communis*, *Pinus ponderosa*, *Poa fendleriana*, *Prunus virginiana*, *Schizachne purpurascens*

VEGETATION DESCRIPTION: This community is dominated by a dense canopy of Ponderosa pine with occasional small trees of green ash, box elder (*Acer negundo*), Rocky Mountain red cedar (*Juniperus scopulorum*) and American elm (*Ulmus americana*) widely scattered in the understory. Two shrub layers are usually present. In the tall shrub layer (1-2 m tall), chokecherry is often present and sometimes common, often with Saskatoon serviceberry and green ash saplings and occasionally with vines such as bittersweet (*Celastrus scandens*) and riverbank grape (*Vitis riparia*). A short shrub layer of wolfberry is often present, with scattered fragrant sumac and occasionally western wild rose (*Rosa woodsii*) on upper slopes and dwarf juniper and scattered northern gooseberry (*Ribes oxycanthoides*) present below. An even shorter shrub underlayer (<0.5 m tall) of Oregon grape and western poison ivy is usually present, at least on lower slopes. Herbaceous cover is often sparse due to shading and accumulation of pine litter on upper and middle slopes, here littleseed ricegrass is often the most common understory species. In slightly more open areas, sedges are abundant, though Kentucky bluegrass is often the dominant species, with scattered patches of slender wheatgrass, nodding brome (*Bromus porteri*), marsh muhly (*Muhlenbergia racemosa*), and false melic (*Schizachne purpurascens*). Common forbs include spreading dogbane, smooth blue aster, and starry false Solomon's-seal. Fragile fern is often frequent as well. Species diversity is moderate to high.

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska which are found in this community include *Acer glabrum*, *Allium cernuum*, *Carex rossii*, *C. xerantica*, *Chaemerion angustifolium*, *Corallorhiza maculata*, *C. wisteriana*, *Goodyera oblongifolia*, *Poa fendleriana*, *P. interior*, *Pterospora andromedea*, *Ranunculus glaberrimus*, *Schizachne purpurascens*, *Symphoricarpos albus*.

STATE RANK: S2

RANK JUSTIFICATION: Though many areas are present on the Pine Ridge, timber cutting and associated disturbance continues to degrade some sites. A dense cover of pine litter in some areas has decreased species richness of the understory and increases the threat of serious fire damage.

GLOBAL RANK: G3G4

COMMENTS: This community intergrades with Ponderosa Pine Woodland, Mixed Coniferous Woodland, and Green Ash Canyon Bottom Woodland, and for mapping purposes is not always separable from these types. Percent canopy cover does not always seem to be as important as environmental factors such as aspect, slope, soils and past management in separating pine forest from woodland, and some sites that have sufficient pine coverage to qualify as forest may have an understory more typical of woodlands. Occurrences outside the Pine Ridge often lack some of the diagnostic shrubs (e.g. *Berberis repens*, *Juniperus communis*) and other understory herbs mentioned here, but are similar in structure and dominant species composition. At least in Nebraska, this community occurs on protected, often steep slopes within pine woodland, and have a considerably more open canopy than deciduous forests.

EXEMPLARY SITES: Metcalf Wildlife Management Area in Sheridan County, Gilbert-Baker Wildlife Management Areas in Sioux County, and numerous canyons in the Pine Ridge Unit of the Nebraska National Forest in Dawes County.

REFERENCES:

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

Nixon, E. S. 1967. A vegetational study of the Pine Ridge of northwestern Nebraska. *The Southwestern Naturalist* 12:134–145.

Tolstead, W. L. 1947. Woodlands in northwestern Nebraska. *Ecology* 28:180–188.

OAK-HICKORY-IRONWOOD FOREST

ELEMENT CODE: CEG002011

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

OTHER NAMES: White oak – Hickory Forest, *Quercus velutina*-*Hicoria ovata* associes (Aikman, 1929); Bur oak-Black oak-Hickory association (Costello, 1931); Southeastern Upland Forest, in part (Steinauer & Rolfsmeier, 2000).

RANGE: This community is best developed along the Missouri River south of Omaha, and small patches may be scattered northward to Dakota County and westward along some major tributaries.

ECOREGIONS: 47h

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to moderately steep upland slopes, usually on the upper slopes of bluffs, though it is often present on middle slopes of south and west exposures. Soils are moderately deep to deep silt loams formed in loess and are usually well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: shagbark hickory (*Carya ovata*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), bur oak (*Quercus macrocarpa*), chinkapin oak (*Q. muehlenbergii*), red oak (*Q. rubra*)

Subcanopy: redbud (*Cercis canadensis*), ironwood (*Ostrya virginiana*), basswood (*Tilia americana*), slippery elm (*Ulmus rubra*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*), prickly-ash (*Zanthoxylum americanum*)

Short shrub: coralberry (*Symphoricarpos orbiculatus*)

Vine: Virginia creeper (*Parthenocissus quinquefolia*), greenbriar (*Smilax hispida*), eastern poison ivy (*Toxicodendron radicans*)

Herbaceous: white snakeroot (*Ageratina altissima*), Canada brome (*Bromus pubescens*), blunt-scale oak sedge (*Carex albicans*), stellate sedge (*C. rosea*), large-flower tick-clover (*Desmodium glutinosum*), dutchman's breeches (*Dicentra cucullaria*), hairy wildrye (*Elymus villosus*), white trout-lily (*Erythronium albidum*), nodding fescue (*Festuca subverticillata*), wood bedstraw (*Galium circaezans*), hairy sunflower (*Helianthus hirsutus*), Virginia creeper (*Parthenocissus quinquefolia*), Canada sanicle (*Sanicula canadensis*) clustered sanicle (*Sanicula odorata*), downy wood violet (*Viola sororia*)

DIAGNOSTIC SPECIES: *Amelanchier arborea*, *Carya ovata*, *Helianthus hirsutus*, *Ostrya virginiana*, *Quercus macrocarpa*, *Q. muehlenbergii*, *Q. rubra*, *Q. velutina*

VEGETATION DESCRIPTION: This community consists of relatively dense cover of tall trees, most commonly red oak and bur oak, with chinkapin oak additionally common in the extreme southeast. Other canopy species that may be locally common are shagbark hickory, hackberry, and green ash. The sub-canopy is usually dominated by ironwood, with slippery elm frequently also common and redbud sometimes common southward. Sometimes shagbark hickory or bitternut hickory (*Carya cordiformis*) is common in the subcanopy. A shrub layer is present and usually sparse, with roughleaf dogwood and prickly ash the common tall shrubs and coralberry often present though usually not as common as on lower slopes. The herbaceous layer is often sparse, and consists of scattered graminoids and forbs. Some forbs, such as white trout-lily and dutchman's breeches may cover extensive areas in early spring. Other common species include Virginia creeper, large-flower tick-clover, clustered sanicle, hairy sunflower, blunt-scale oak sedge, hairy wildrye and white snakeroot. Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Uncommon species in this community include *Asplenium platyneuron*, *Carex texensis*, *Corallorhiza odontorhiza*, *C. wisteriana*, *Desmodium cuspidatum*, *Galearis spectabilis*, *Geum vernum*, *Lilium michiganense*, *Monotropa hypopithys*, *M. uniflora*, *Panax quinquefolium*, *Piptatherum racemosum*, *Viola viarum*, and *Vitis aestivalis*.

STATE RANK: S?

RANK JUSTIFICATION: This community is mostly restricted to moderate slopes above the Missouri River in southeast Nebraska. Many sites were cut extensively around the turn of the century. Presently, many sites are degraded by overgrazing.

GLOBAL RANK: G3

COMMENTS: Despite the community name, hickories are often not a major part of this community. North of Omaha, shagbark hickory quickly drops out and bitternut hickory becomes increasingly restricted to lower slope communities. In general, this community is distinguishable in that it is not overwhelmingly dominated by bur oak, unlike most other upland forest types. North of Omaha, this community probably exists as small patches associated with Red Oak – Basswood – Ironwood Forest.

This community seems roughly equivalent to the *Quercus alba* - *Carya ovata* / *Ostrya virginiana* Forest community of Iowa and Missouri, except that *Quercus macrocarpa*, *Q. muehlenbergii*, and *Q. rubra* take the place of *Q. alba* in Nebraska. Steinauer and Rolfsmeier (2000) included this community with the Red Oak – Baswood – Ironwood Forest in the Southeastern Upland Forest community, and these communities are probably best combined for vegetation mapping purposes.

EXEMPLARY SITES: Extensive examples are preserved at Fontenelle Forest in Sarpy County, Indian Cave State Park in Nemaha and Richardson counties, and Rulo Bluffs Preserve in Richardson County.

REFERENCES:

- Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. Botanical Seminar, University of Nebraska Botanical Survey, New Series 5:1–75.
- Costello, D. F. 1931. Comparative study of river bluff succession on the Iowa and Nebraska sides of the Missouri River. Botanical Gazette 91:295–307.

BUR OAK – BASSWOOD - IRONWOOD FOREST

ELEMENT CODE: CEG002012

GLOBAL NAME: *Tilia americana* – (*Quercus macrocarpa*) / *Ostrya virginiana* Forest

OTHER NAMES: *Tilia americana* consociation (Aikman, 1929); Linden-Cedar-Ironwood-Ash association (Pool, 1914); Northeastern Upland Forest (Steinauer & Rolfsmeier, 2000)

RANGE: This community is best-developed on bluffs along the south side of the Missouri River from Dakota County westward to Knox County, and on the south side of the Niobrara River in Brown County. It likely occurs westward in the Missouri River valley and eastward along the Niobrara. It also may be present as sporadic occurrences southward to the Omaha area.

ECOREGIONS: 43c, 47k

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes of bluffs and adjacent uplands along the margins of river valleys, mostly on north and east-facing slopes. Soils are well drained to moderately well drained silt loams, loams, and sandy loams formed in loess or colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), bur oak (*Quercus macrocarpa*), basswood (*Tilia americana*)

Subcanopy: eastern red cedar (*Juniperus virginiana*), ironwood (*Ostrya virginiana*), slippery elm (*Ulmus rubra*), rock elm (*Ulmus thomasi*)

Tall shrub: chokecherry (*Prunus virginiana*)

Short shrub: Missouri gooseberry (*Ribes missouriense*)

Vine: Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), riverbank grape (*Vitis riparia*)

Herbaceous: common wood sedge (*Carex blanda*) longbeak sedge (*C. sprengelii*), dutchman's breeches (*Dicentra cucullaria*), annual bedstraw (*Galium aparine*), Virginia waterleaf (*Hydrophyllum virginianum*), aniseroot (*Osmorhiza longistylis*), bloodroot (*Sanguinaria canadensis*), Canada sanicle (*Sanicula canadensis*), Canada violet (*Viola canadensis*).

DIAGNOSTIC SPECIES: *Carex sprengelii*, *Ostrya virginiana*, *Quercus macrocarpa*, *Sanguinaria canadensis*, *Tilia americana*, *Viola canadensis*

VEGETATION DESCRIPTION: The overstory of this community is generally dominated by bur oak, with basswood frequent to common in places. Other common canopy trees include green ash and hackberry. Hop hornbeam is common in the subcanopy, with scattered red mulberry (*Morus rubra*) and rock elm in sites along the Missouri, and eastern red cedar often common along the Niobrara. Shrubs and vines are scattered and uncommon, with chokecherry and Missouri gooseberry the most frequently encountered. The herbaceous layer varies from sparsely to moderately vegetated, with longbeak sedge often abundant in some sites, with numerous other forbs and graminoids variously common, including Virginia waterleaf, annual bedstraw, Canada sanicle and aniseroot. Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska which are known from this community include *Allium tricoccum*, *Arabis shortii*, *Aralia nudicaulis*, *Botrychium campestre*, *Carex peckii*, *Dryopteris carthusiana*, *Panax quinquefolium*, and *Piptatherum racemosum*.

STATE RANK: S2S3

RANK JUSTIFICATION: This community is fairly common in parts of northeast Nebraska, but most sites have been impacted by past timber cutting and are frequently heavily grazed and disturbed. Invasion by eastern red cedar threatens to degrade sites in the Niobrara River valley.

GLOBAL RANK: G3

COMMENTS: South of the Sioux City area this community grades into Oak – Hickory – Ironwood Forest and Red Oak – Basswood – Ironwood Forest. Some sites away from the Missouri and Niobrara that were formerly included in this community are now placed in the Upland Bur Oak Forest community. This community is roughly equivalent to the Northeastern Upland Forest of the 2000 classification. It may occur with and intergrade with Upland Bur Oak Forest or Lowland Hackberry - Black Walnut Forest along the Missouri, and Ponderosa Pine Woodland and Paper Birch Springbranch Canyon Forest along the Niobrara.

EXEMPLARY SITES: The Niobrara Valley Preserve in Brown and Cherry Counties, and Ponca State Park in Dixon County

REFERENCES:

- Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. *Botanical Seminar, University of Nebraska Botanical Survey, New Series* 5:1–75.
- Churchill, S. P., C. C. Freeman, and G. E. Kantak. 1988. The vascular flora of the Niobrara Valley Preserve and adjacent areas in Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:1–15.
- Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara Valley, Nebraska. *The Southwestern Naturalist* 40:129–138.
- Pool, R. J. 1914. A study of vegetation of the sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–312.
- Rolfsmeier, S. B. 1989. Species richness gradients of oak forest plants along the Missouri River in Nebraska and Iowa. M.S. thesis, University of Nebraska-Lincoln: 95pp.

PAPER BIRCH SPRINGBRANCH CANYON FOREST

ELEMENT CODE: CEGL002013

GLOBAL NAME: *Betula papyrifera* – (*Tilia americana*, *Quercus macrocarpa*) Canyon Forest

OTHER NAMES: Paper Birch Canyon Forest, Boreal Relict Community (Kantak, 1995), Paper Birch association (Pool, 1914); Northern Springbranch Canyon Forest (Steinauer & Rolfsmeier, 2000).

RANGE: This community occurs along a 50 km stretch of the Niobrara River from Valentine in eastern Cherry County to the mouth of Plum Creek in western Brown County. A historic collection of paper birch from Merriman indicates that it may also occur in northwest Cherry County.

ECOREGIONS: 43r.

ENVIRONMENTAL DESCRIPTION: This community occurs primarily in spring-fed tributary canyons (springbranches) and along lower slopes of bluffs on the south side of the Niobrara River. Soils are deep loams and sandy loams formed in eolian sand, colluvium, alluvium, and Rosebud siltstone. Soils near seeps and on lower slopes of springbranch canyons remain moist to saturated throughout the year and often have a dense layer of organic matter; those on middle and upper slopes tend to be moderately well-drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: paper birch (*Betula papyrifera*), green ash (*Fraxinus pennsylvanica*), basswood (*Tilia americana*)

Subcanopy: eastern red cedar (*Juniperus virginiana*), ironwood (*Ostrya virginiana*)

Shrub: chokecherry (*Prunus virginiana*), wolfberry (*Symphoricarpos occidentalis*)

Short shrub: western poison ivy (*Toxicodendron rydbergii*)

Vine: Virginia creeper (*Parthenocissus quinquefolia*), riverbank grape (*Vitis riparia*)

Herbaceous: wild sarsaparilla (*Aralia nudicaulis*), grove sandwort (*Arenaria lateriflora*), sedges (*Carex blanda*, *C. eburnea*, *C. peckii*, *C. saximontana*, *C. sprengelii*), enchanter's nightshade (*Circaea lutetiana*), brittle bladder fern (*Cystopteris fragilis*), hairy wildrye (*Elymus villosus*), common scouringrush (*Equisetum hyemale*), nodding fescue (*Festuca subverticillata*), bedstraws (*Galium aparine*, *G. triflorum*), wood nettle (*Laportea canadensis*), littleseed ricegrass (*Piptatherum micranthum*), Solomon's-seal (*Polygonatum biflorum*), starry false Solomon's-seal (*Smilacina stellata*), smooth blue aster (*Symphotrichum laeve*).

DIAGNOSTIC SPECIES: *Aralia nudicaulis*, *Arenaria lateriflora*, *Betula papyrifera*, *Ostrya virginiana*

VEGETATION DESCRIPTION: The dominant overstory trees in this community are paper birch, which occurs in areas where its roots are continuously in contact with the water table, and basswood, which occurs on adjacent low slopes. Ironwood is the dominant understory tree, with green ash and juniper present, but less common. Shrubs are sparse, though a short shrub layer of western poison ivy may be abundant. The herbaceous understory is likewise often sparse, with the slopes dominated by woodland sedges and grasses typical of the surrounding forest communities. Mesophytic forbs are often common on the lower slopes, including wood nettle and cow parsnip (*Heracleum lanatum*). Two forb species diagnostic of this community are wild sarsaparilla and grove sandwort, both of which may be abundant. In the canyon bottoms, mosses, liverworts, and forbs typical of the spring seep/stream community are common. Species diversity is relatively high.

OTHER NOTEWORTHY SPECIES: Uncommon species found in this community include *Aralia nudicaulis*, *Arenaria lateriflora*, *Carex peckii*, *Dryopteris carthusiana*, *Maianthemum canadense*, and *Platanthera aquilonis*.

STATE RANK: S1

RANK JUSTIFICATION: This community is extremely limited in its overall range. Paper birch trees are dying out in many places.

GLOBAL RANK: G2?

COMMENTS: This community usually occurs as patches within the Bur Oak – Basswood – Ironwood Forest community and intergrades with it; in fact it may be included in that community for mapping purposes. On the upper end of springbranch canyons, the community often gives way to Bur Oak Woodland and Ponderosa Pine Woodland or a combination of the two.

This community is known only from Nebraska, but is similar to some types from the Black Hills, especially the Paper birch / Hazel Forest community.

EXEMPLARY SITES: Fort Niobrara National Wildlife Refuge and Smith Falls State Park in Cherry County, the Niobrara Valley Preserve in Brown and Cherry Counties

REFERENCES:

Churchill, S. P., C. C. Freeman, and G. E. Kantak. 1988. The vascular flora of the Niobrara Valley Preserve and adjacent areas in Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:1–15.

Harrison, A. T. 1980. The Niobrara Valley Preserve: its biogeographic importance and description of its biotic communities. A working report to The Nature Conservancy. Minneapolis, Minnesota: 116 pp.

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara Valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

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RED OAK-BASSWOOD - IRONWOOD FOREST

ELEMENT CODE: CEG002061

GLOBAL NAME: *Acer saccharum* – [*Acer nigrum*] – *Tilia americana* – *Quercus rubra* / *Ostrya virginiana* Forest

OTHER NAMES: *Quercus maxima*-*Tilia americana* association (Aikman, 1929), Linden-Ironwood Association (Costello, 1931), Mesic Upland Forest (Steinauer & Rolfsmeier, 1997)

RANGE: This community is best developed along the Missouri River from southern Washington County southward. It is sporadically present north to Dakota County and westward along the Platte River.

ECOREGIONS: 47h

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to moderately steep middle and lower slopes of bluffs, and is usually best developed on north and east-facing exposures. Soils are moderately deep to deep silt loams formed in loess and are usually well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: bitternut hickory (*Carya cordiformis*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), red oak (*Q. rubra*), basswood (*Tilia americana*)

Subcanopy: pawpaw (*Asimina triloba*), red mulberry (*Morus rubra*), ironwood (*Ostrya virginiana*), slippery elm (*Ulmus rubra*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*), bladdernut (*Staphylea trifolia*)

Short shrub: coralberry (*Symphoricarpos orbiculatus*)

Vine: Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), greenbriar (*Smilax hispida*)

Herbaceous: common wood sedge (*Carex blanda*), Davis' sedge (*C. davisii*), James' sedge (*C. jamesii*), bur-reed sedge (*C. sparganioides*), enchanter's nightshade (*Circaea lutetiana*), lowland bladder fern (*Cystopteris protrusa*), dutchman's breeches (*Dicentra cucullaria*), white trout-lily (*Erythronium albidum*), wood nettle (*Laportea canadensis*), moonseed (*Menispermum canadense*), aniseroot (*Osmorhiza longistylis*), Virginia creeper (*Parthenocissus quinquefolia*), clustered sanicle (*Sanicula odorata*), downy yellow violet (*Viola pubescens*)

DIAGNOSTIC SPECIES: *Adiantum pedatum*, *Asimina triloba*, *Carex jamesii*, *C. hitchcockiana*, *Galium concinnum*, *Ostrya virginiana*, *Podophyllum peltatum*, *Quercus rubra*, *Staphylea trifolia*

VEGETATION DESCRIPTION: This community consists of relatively dense cover of tall trees, most commonly red oak and basswood, with black walnut frequently also present. Other trees that may be common in the canopy include bitternut hickory, hackberry, green ash, and Kentucky coffeetree (*Gymnocladus dioica*). The sub-canopy is usually dominated by hop hornbeam, with red mulberry and red elm also common. North of Washington County, rock elm (*Ulmus thomasii*) may also be conspicuous. In the far southeastern part of the state, a short subcanopy of pawpaw is generally also present. A tall shrub layer <2 m tall is present and usually sparse, with bladdernut and American hazelnut common in the far southeast, and scattered roughleaf dogwood present elsewhere. A conspicuous short shrub layer of coralberry is a common feature of this community, especially southward, with Missouri gooseberry (*Ribes missouriense*) and black raspberry (*Rubus occidentalis*) scattered. The herbaceous layer is relatively lush, and contains numerous sedges such as common wood sedge, Davis' sedge, few-fruited sedge (*C. oligocarpa*) and James' sedge. Common forbs include white trout-lily and dutchman's breeches in early spring, and Virginia creeper, clustered sanicle, lowland bladder fern, maidenhair fern (*Adiantum pedatum*), wood nettle, honewort (*Cryptotaenia canadensis*), blue wood phlox (*Phlox divaricata*), late figwort (*Scrophularia marilandica*) and enchanter's nightshade later in the season. Virginia waterleaf (*Hydrophyllum virginianum*) is an increasingly common component northward. Species diversity is high.

OTHER NOTEWORTHY SPECIES: Uncommon species in this community include *Actaea pachypoda*, *Aesculus glabra*, *Agastache scrophulariifolia*, *Allium tricoccum*, *Aralia racemosa*, *Arisaema dracontium*, *Asimina triloba*, *Brachyelytrum erectum*, *Cardamine concatenata*, *Carex albursina*, *C. hirtifolia*, *Caulophyllum thalictroides*, *Cerastium nutans*, *Claytonia virginica*, *Corydalis flavula*, *Cypripedium parviflorum*, *Cystopteris bulbifera*, *Galearis spectabilis*, *Lobelia inflata*, *Panax quinquefolium*, *Podophyllum peltatum*, *Ranunculus recurvatus*, *Ruellia strepens*, *Triphora trianthophora*, and *Ulmus thomasii*.

STATE RANK: S?

RANK JUSTIFICATION: This community is mostly restricted to richly forested bluffs in the southeast part of the state, and many remaining tracts are in fairly good condition, as these sites are generally in deep ravines less accessible to logging than other upland forests. Many sites may be degraded by overgrazing.

GLOBAL RANK: G3G4

COMMENTS: This community is closest to NatureServe's Central Maple-Basswood Forest, which is primarily south of our range. The hard maple component is not present in Nebraska. This community is synonymous with the Mesic Upland Forest of the 1997 classification, which was combined with the Oak-Hickory-Ironwood Forest community into Southeastern Upland Forest in the 2000 classification. It seems to be more distinct from the other upland oak forest communities than most of those communities are from each other. In Nebraska, this community always occurs in association with Oak-Hickory-Ironwood Forest or Upland Bur Oak Forest

northward, and it is usually difficult to discern a boundary between the two. For vegetation mapping purposes it may be necessary to include these upper and lower slope communities (along with the Lowland Hackberry – Black Walnut Forest) as “Southeastern Upland Forest”.

North of Washington County and west of the Missouri River this community becomes more patchy and discontinuous, and may intergrade with Bur Oak-Basswood-Ironwood Forest or Upland Bur Oak Forest. Many sites have either red oak or basswood as the dominant and often contain other trees typical of upper slope and ravine bottom woods. The subcanopy and herbaceous understory are usually fairly consistent, but tend to vary along a north-south gradient.

EXEMPLARY SITES: Representative examples are common at Indian Cave State Park in Richardson County. Other extensive stands are preserved at Rulo Bluffs Preserve in Richardson County, Fontenelle Forest in Sarpy County, and Neale Woods in Washington County.

REFERENCES:

Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. Botanical Seminar, University of Nebraska Botanical Survey, New Series 5:1–75.

Costello, D. F. 1931. Comparative study of river bluff succession on the Iowa and Nebraska sides of the Missouri River. Botanical Gazette 91:295–307.

UPLAND BUR OAK FOREST

ELEMENT CODE: CEG002072

GLOBAL NAME: *Quercus macrocarpa* / (*Amelanchier alnifolia*, *Cornus drummondii*) / *Aralia nudicaulis* Forest

OTHER NAMES: Northern Bur Oak Mesic Forest; Bur Oak-Bitternut Hickory Community (Weaver, 1965). Eastern Deciduous Forest Community (Rolfsmeier, 1988). Bur Oak Forest (Steinauer & Rolfsmeier, 2000).

RANGE: This community is found in the eastern fourth of the state, extending slightly westward along the Niobrara and Loup River systems. It is most common in the drainages of the lower Niobrara, Elkhorn, Platte, Big and Little Blue and Big Nemaha rivers.

ECOREGIONS: 27a, 27e, 27f, 42p, 42h, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes of draws and bluffs usually with a north or east aspect, and are often associated with streams and rivers. Soils are well-developed silt loams or sandy loams formed primarily in loess and glacial till (and in limestone or sandstone to a lesser extent). The sites are well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), bur oak (*Quercus macrocarpa*)

Tree subcanopy: hackberry (*Celtis occidentalis*), eastern red cedar (*Juniperus virginiana*), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*), chokecherry (*Prunus virginiana*), prickly-ash (*Zanthoxylum americanum*)

Short shrub: Missouri gooseberry (*Ribes missouriense*), wolfberry (*Symphoricarpos occidentalis*), coralberry (*S. orbiculatus*)

Vine: bittersweet (*Celastrus scandens*), Virginia creeper (*Parthenocissus quinquefolia*), greenbriar (*Smilax hispida*), eastern poison ivy (*Toxicodendron radicans*)

Herbaceous: white snakeroot (*Ageratina altissima*), common wood sedge (*Carex blanda*), longbeak sedge (*C. sprengelii*), large-flower tick-clover (*Desmodium glutinosum*), hairy wildrye (*Elymus villosus*), nodding fescue (*Festuca subverticillata*), annual bedstraw (*Galium aparine*), common stickseed (*Hackelia virginiana*), moonseed (*Menispermum canadense*), aniseroot (*Osmorhiza longistylis*), Virginia creeper (*Parthenocissus quinquefolia*), Canada sanicle (*Sanicula canadensis*), clustered sanicle (*Sanicula odorata*), downy wood violet (*Viola sororia*)

DIAGNOSTIC SPECIES: *Quercus macrocarpa*, *Ulmus rubra*

VEGETATION DESCRIPTION: These sites are primarily dominated by bur oak, though in some sites green ash may also be conspicuous on upper slopes, while hackberry, black walnut (*Juglans nigra*) or basswood (*Tilia americana*) may be common on lower slopes. Red elm and hackberry are the most common subcanopy trees, with lesser amounts of green ash and American elm (*Ulmus americana*). In the extreme southeast, bitternut hickory (*Carya cordiformis*), redbud (*Cercis canadensis*), or red mulberry (*Morus rubra*) may be locally common in the subcanopy. Degraded sites may be invaded by eastern red cedar (*Juniperus virginiana*), the introduced Siberian elm (*Ulmus pumila*), or white mulberry (*Morus alba*). Eastern red cedar is especially prominent in the lower Niobrara and upper Missouri drainages, where it may outcompete nearly all other understory species. The shrub layer varies from somewhat dense to sparse or nearly absent. The tall shrub layer is sparse to moderate and usually contains roughleaf dogwood in the south or chokecherry in the north. Prickly-ash is locally common throughout. Short shrubs are often more prominent, especially Missouri gooseberry and coralberry, with scattered wolfberry in some sites northward. The herbaceous layer is usually fairly sparse on upper slopes and quite dense below. Among the common species are several shade tolerant graminoids such as common wood sedge, narrowleaf inflated sedge (*Carex grisea*), nodding fescue, and hairy wildrye. Virginia creeper commonly dominates the forest floor of most sites, with clustered sanicle or aniseroot often equally abundant on lower slopes. Longbeak sedge may overwhelmingly dominate the forest floor in the far north. Other

frequent forbs include white snakeroot, annual bedstraw, downy wood violet, large-flower tick-clover, Jack-in-the-pulpit (*Arisaema triphyllum*), and honewort (*Cryptotaenia canadensis*). White trout-lily (*Erythronium albidum*) and Dutchman's breeches (*Dicentra cucullaria*) often blanket the forest floor of some higher quality sites in early spring. Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Rock elm (*Ulmus thomasii*) may be present in this community in northeast Nebraska. Green dragon (*Arisaema dracontium*), pale Indian plantain (*Arnoglossum atriplicifolium*), mullein foxglove (*Dasistoma macrophylla*), violet bush-clover (*Lespedeza violacea*) and southern dewberry (*Rubus enslenii*) have been found in this community in southeast Nebraska.

STATE RANK: S2S3

RANK JUSTIFICATION: These areas are fairly widespread in portions of eastern Nebraska, but many are degraded by overgrazing. Many, if not most have been heavily logged in the past.

GLOBAL RANK: G4

COMMENTS: For the most part this community is fairly distinctive, with a canopy predominately to wholly dominated by bur oak. In some sites north of the Platte River, basswood may be common in the canopy or subcanopy of lower slopes. These sites and the Bur oak – Basswood – Ironwood Forest were combined as the Northeastern Upland Forest community in the 2000 classification. In extreme southeast Nebraska and along the lower Platte, red oak (*Quercus rubra*) may be co-dominant with bur oak, or even dominant on lower slopes. These sites were formerly combined with the Oak – Hickory – Ironwood Forest and the Red Oak – Basswood – Ironwood Forest as the Southeastern Upland Forest community. In the current classification, all forest with bur oak in the canopy and without ironwood in the subcanopy are combined into Upland Bur Oak Forest. Further analyses are needed to compare overall species composition of upland forest types in eastern Nebraska. All sites seen occur in uplands, with the exception of a site in the Platte River floodplain in Dodge County which has a canopy of bur oak and a dense subcanopy of basswood. It otherwise resembles Upland Bur Oak Forest in overall species composition.--

On the Missouri River bluffs in northeast Nebraska, this community may form a band on the uppermost slopes of Bur Oak – Basswood – Ironwood Forest and is oftentimes infested with eastern red cedar. In many sites along the upper Missouri and lower Niobrara it may be heavily infested by eastern red cedar so that nearly all other native understory is nearly absent. Some sites may be difficult to distinguish from bur oak dominated woodland. This community is not as well represented along the Missouri River bluffs in the southeast, where it may be indistinguishable from Oak – Hickory – Ironwood Forest. The global name is described based on bur oak forest north of our range, and Nebraska sites may be separate community. Upland Bur Oak Forest may intergrade with Oak Woodland, particularly northward and westward.

EXEMPLARY SITES: Burr Oak and Oak Glen Wildlife Management Areas in Seward County, Hickory Ridge Wildlife Management Area in Johnson County, Wiseman Wildlife Management Area in Cedar County, Oak Valley Wildlife Management Area in Madison County.

REFERENCES:

Beightol, D. A., and T. B. Bragg. 1993. Woody vegetation of a disjunct bur oak (*Quercus macrocarpa*) forest in east central Nebraska. Transactions of the Nebraska Academy of Sciences 20:41–46.

Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. Transactions of the Nebraska Academy of Sciences 16:91–113.

LOWLAND BUR OAK FOREST

ELEMENT CODE: C EGL002052

GLOBAL NAME: *Quercus macrocarpa* / *Andropogon gerardii* – *Panicum virgatum*
Woodland

OTHER NAMES: Mesic Bur Oak Forest (Steinauer & Rolfsmeier, 2000)

RANGE: This community is known from southeast Nebraska in the drainages of Salt Creek, and the lower Big Blue and Big Nemaha rivers. It may be present northward as well.

ECOREGIONS: 47i

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level terraces of relatively small, permanent streams. Soils are well-developed silt loams and silty clay loams formed in loess. The sites are moderately well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: hackberry (*Celtis occidentalis*), bur oak (*Quercus macrocarpa*)

Tree subcanopy: hackberry, American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*)

Short shrub: Missouri gooseberry (*Ribes missouriense*), coralberry (*Symphoricarpos orbiculatus*)

Herbaceous: smooth clustered sedge (*Carex aggregata*), common wood sedge (*C. blanda*), inflated narrowleaf sedge (*C. grisea*), wild chervil (*Chaerophyllum procumbens*), waterpod (*Ellisia nyctelea*), McGregor's wildrye (*Elymus macgregorii*), Virginia wildrye (*Elymus virginicus*), nodding fescue (*Festuca subverticillata*), annual bedstraw (*Galium aparine*), wood nettle (*Laportea canadensis*), whitegrass (*Leersia virginica*), Virginia creeper (*Parthenocissus quinquefolia*), wingstem (*Verbesina alternifolia*)

DIAGNOSTIC SPECIES: *Arabis shortii*, *Celtis occidentalis*, *Chaerophyllum procumbens*, *Diarrhena obovata*, *Elymus macgregorii*, *Laportea canadensis*, *Quercus macrocarpa*, *Verbesina alternifolia*

VEGETATION DESCRIPTION: The canopy of sites is commonly dominated by hackberry and bur oak in nearly equal proportion, or by a canopy of bur oak with a conspicuous tall subcanopy of hackberry. Scattered large honey locust (*Gleditsia triacanthos*), black walnut (*Juglans nigra*), or Plains cottonwood (*Populus deltoides*) are sometimes also present. The subcanopy is variable and is either overwhelmingly dominated by tall hackberry, or more frequently a shorter layer of American elm and slippery elm. Bitternut hickory (*Carya cordiformis*), red mulberry (*Morus rubra*) or basswood (*Tilia americana*) may be present in richer sites. Other trees sometimes present include silver maple (*Acer saccharinum*) and Ohio buckeye (*Aesculus glabra*). The shrub layer is often sparse or nearly absent, usually represented by scattered coralberry and lesser amounts of Missouri gooseberry. The herb layer is fairly dense and consists of forest graminoids such as sedges, nodding fescue, and Virginia wildrye, with annuals in disturbed openings, such as annual bedstraw, waterpod and wild chervil. White trout-lily (*Erythronium albidum*) and Dutchman's breeches (*Dicentra cucullaria*) are sometimes present, but are never as common as in Upland Bur Oak Forest. Virginia creeper often covers the forest floor early in the season, but is overtaken by tall coarse perennials including wood nettle, wingstem, jumpseed (*Polygonum virginianum*) and stinging nettle (*Urtica dioica*) as the season progresses. Species diversity is moderate to high.

OTHER NOTEWORTHY SPECIES: Ohio buckeye (*Aesculus glabra*), Short's rockcress (*Arabis shortii*), and sycamore (*Platanus occidentalis*) are known from this community.

STATE RANK: S1?

RANK JUSTIFICATION: Most presettlement tracts of lowland oak forest were cleared for timber and often degraded by overgrazing.

GLOBAL RANK: G?

COMMENTS: The full geographic range of this community is unknown. A lowland oak forest type is reported for northeastern Kansas (Lauver, *et al.*, 1999), which is included by them in the *Quercus macrocarpa* – *Quercus shumardii* – *Carya cordiformis* / *Chasmanthium latifolium* Forest community, which NatureServe regards as occurring no farther north than southeast Kansas. It is also strikingly similar to the *Quercus macrocarpa* – *Q. bicolor* – (*Celtis occidentalis*) Woodland community found to the east of our area. In the 2000 classification, this community was grouped with NatureServe's *Quercus macrocarpa* / *Andropogon gerardii* – *Panicum virgatum* Woodland community, and regarded as a closed-canopy, forested version of it. This community type has been provisionally left in this category. Some land managers have been led to believe these sites represent "degraded" oak savannas and should be destructively managed to restore savanna conditions (although herbaceous dominants of savanna communities are rarely, if ever, present in these sites). It is believed that since these sites occur along permanent streams (now extremely downcut), that periodic spring flooding may have protected these sites from fire and allowed them to maintain forest species. Currently, no level, lowland open oak woodlands or savannas are known in Nebraska.

Lowland Bur Oak Forest closely resembles the Lowland Hackberry – Black Walnut Forest community and may eventually need to be combined with it. Logged examples of this community often revert to forest, but trees such as honey locust tend to replace bur oak in the canopy. Eastern Riparian Forest is sometimes associated with this community, especially in lower depressions, and the two may intergrade. More study of this community type is needed.

EXEMPLARY SITES: Perhaps the best-preserved example of this community is at Homestead National Monument in Gage County. Other representative occurrences are known from Lancaster, Pawnee, and Richardson counties.

REFERENCES:

LOWLAND HACKBERRY-BLACK WALNUT FOREST

ELEMENT CODE: CEGLO0000H

GLOBAL NAME: None presently designated.

OTHER NAMES: Eastern Lowland Forest, in part (Steinauer & Rolfsmeier, 2000).

RANGE: This community is associated with upland oak forest in the eastern quarter of the state.

ECOREGIONS: 27a, 47.

ENVIRONMENTAL DESCRIPTION: The community is best developed in level ground at the base of upland deciduous forested bluffs, and may continue well upslope in the bottom of deep ravines. Soils are moderately well drained silt loams formed in loess or alluvium and are nutrient rich.

COWARDIN WETLAND SYSTEM: Upland.

MOST ABUNDANT SPECIES:

Tree canopy: hackberry (*Celtis occidentalis*), Kentucky coffeetree (*Gymnocladus dioica*), black walnut (*Juglans nigra*).

Subcanopy: green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), rock elm (*Ulmus thomasi*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*), prickly-ash (*Zanthoxylum americanum*)

Short shrub: Missouri gooseberry (*Ribes missouriense*)

Vines: Virginia creeper (*Parthenocissus quinquefolia*), bristly greenbriar (*Smilax hispida*), eastern poison ivy (*Toxicodendron radicans*).

Herbaceous: common wood sedge (*Carex blanda*), Davis' sedge (*C. davisii*), longbeak sedge (*C. sprengelii*), honewort (*Cryptotaenia canadensis*), annual bedstraw (*Galium aparine*), Virginia waterleaf (*Hydrophyllum virginianum*), yellow jewelweed (*Impatiens pallida*), wood nettle (*Laportea canadensis*), moonseed (*Menispermum canadense*), aniseroot (*Osmorhiza longistylis*), Virginia creeper (*Parthenocissus quinquefolia*), golden-glow (*Rudbeckia laciniata*), clustered sanicle (*Sanicula odorata*), stinging nettle (*Urtica dioica*).

DIAGNOSTIC SPECIES: *Celtis occidentalis*, *Gymnocladus dioica*, *Juglans nigra*.

VEGETATION DESCRIPTION: This community is usually dominated by large black walnuts to 30 m tall, with hackberry usually also common and scattered Kentucky coffeetree often present. Occasionally scattered green ash, bur oak (*Quercus macrocarpa*), or honey locust (*Gleditsia triacanthos*) may occur in the canopy. The subcanopy is variable, with American elm usually abundant (with rock elm northward), and red oak (*Quercus rubra*) and basswood (*Tilia americana*) present in some richer sites. Ironwood (*Ostrya virginiana*) may extend a short distance into the woods at the base of upland bluff forest. The shrub layer is usually poorly developed, with a few roughleaf dogwoods or prickly-ash sometimes scattered, or more frequently just a short shrub layer of Missouri gooseberry. The herbaceous understory is usually lush and often dominated by wood nettle and clustered sanicle, with Virginia waterleaf and longbeak sedge common northward and wingstem common southward. Other conspicuous species include sedges and stinging nettle. Westward, wood nettle drops out and more species typical of upland bur oak forest may be present. Species diversity is moderate to high.

OTHER NOTEWORTHY SPECIES: Rock elm (*Ulmus thomasi*) and nannyberry (*Viburnum lentago*) are known from this community in northeast Nebraska.

STATE RANK: S?

RANK JUSTIFICATION: Though somewhat widespread, most examples of community have been cut for timber and in many places this community is restricted to a narrow band that is frequently invaded by exotic species. Few extensive examples of this community remain, and most may be overgrazed by both cattle and deer.

GLOBAL RANK: G?

COMMENTS: Most examples of this community are restricted to broad ravine bottoms in upland bluff forest and nearly all have been impacted by heavy grazing at some point. In the few places where this community extends out onto river terraces, it may border eastern riparian forest and intergrade with it. It is found with Red Oak – Basswood – Ironwood, Bur Oak – Basswood – Ironwood and Upland Bur Oak Forest communities, and when as it extends upslope in ravines, the species of those communities tend to be represented in it. Aikman (1929) briefly mentions a black walnut dominated community occurring at the bases of oak forest bluffs, but did not provide a description. For mapping purposes, this community may be included in association with the surrounding forest types.

The Lowland Bur Oak Forest is similar in most respects to this community, and bur oak may be present in Lowland Hackberry – Black Walnut Forest, but it is never dominant. It may be possible that some Lowland Hackberry – Black Walnut Forest may represent degraded Lowland Bur Oak Forest. A portion of Lowland Bur Oak Forest tract at Homestead National Monument that was logged in the 1930's is now dominated by honey locust (*Gleditsia triacanthos*) and hackberry. Black walnut is present in the subcanopy, but is not common. More study of mesic forest communities is needed.

EXEMPLARY SITES: A fairly well-preserved example is found in a deep ravine in Hummel Park in Douglas County.

REFERENCES:

Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. Botanical Seminar, University of Nebraska Botanical Survey, New Series 5:1–75.

WETLAND WOODLANDS

WESTERN RIPARIAN WOODLAND

ELEMENT CODE: CEGl000659 (also includes CEGl000939, CEGl001454, CEGl002649)

GLOBAL NAME: *Populus deltoides* - (*Salix amygdaloides*) / *Salix. exigua* Woodland

OTHER NAMES: Cottonwood – Peachleaf Willow Floodplain Woodland, Eastern cottonwood Woolly Sedge Woodland, Cottonwood – Inland Saltgrass Floodplain Woodland, Cottonwood – Switchgrass Floodplain Woodland; *Populus* open meadow (Currier, 1982)

RANGE: This community is found along streams and rivers, primarily in the central and western portions of the State.

ECOREGIONS: 25, 27b, 27e, 27g, , 42, 43, 44?

ENVIRONMENTAL DESCRIPTION: This community is found in floodplains and on low terraces of streams and rivers. Soils are usually poorly developed, consisting predominately of sand, with lesser amounts of silt, clay or gravel, formed in alluvium. Drainage varies with height of the community above the river level.

COWARDIN WETLAND SYSTEM: Palustrine forested, temporarily flooded.

MOST ABUNDANT SPECIES:

Tree canopy: Plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*)

Tree subcanopy: box-elder (*Acer negundo*), Russian olive (*ELAEAGNUS ANGUSTIFOLIA*), green ash (*Fraxinus pensylvanica*)

Tall shrub: chokecherry (*Prunus virginiana*), wild plum (*Prunus americana*), sandbar willow (*Salix exigua*), buffaloberry (*Shepherdia argentea*)

Short shrub: wolfberry (*Symphoricarpos occidentalis*)

Herbaceous: annual ragweed (*Ambrosia artemisiifolia*), smooth brome (*BROMUS INERMIS*), Emory's sedge (*Carex emoryi*), woolly sedge (*C. pellita*), Canada wildrye (*Elymus canadensis*), western wheatgrass (*Elymus smithii*), field horsetail (*Equisetum arvense*), wild licorice (*Glycyrrhiza lepidota*), green needlegrass (*Nassella viridula*), Kentucky bluegrass (*POA PRATENSIS*), prairie cordgrass (*Spartina pectinata*), sand dropseed (*Sporobolus cryptandrus*)

DIAGNOSTIC SPECIES: *Populus deltoides*, *Salix amygdaloides*, *S. exigua*

VEGETATION DESCRIPTION: This community is dominated by a fairly tall (6-17 m), open canopy of cottonwoods and slightly shorter peachleaf willows. In broad stream valleys, the subcanopy is often poorly developed and contains scattered small trees of box-elder and green ash, with Russian olive or junipers (*Juniperus scopulorum*, *J. virginiana*) often invading to a large extent. In canyons or at the bases of steep banks, the subcanopy may be denser with scattered American elm (*Ulmus americana*) and hackberry (*Celtis occidentalis*) in addition to ash and box-elder. Patches of shrubs are generally present and conspicuous under the open canopy of this community. A shrub layer 2-4 m tall is usually present, with sandbar willow most common in lower ground, while on higher terraces and adjacent banks, wild plum, chokecherry and buffaloberry may be conspicuous. Eastward, roughleaf dogwood (*Cornus drummondii*) and false indigobush (*Amorpha fruticosa*) comprise the bulk of the tall shrub layer. Patches of wolfberry form a short shrub stratum at many sites.

The herbaceous layer is often relatively sparse and quite variable. In low ground it usually consists of hydrophytic and mesophytic graminoids < 1 m tall, which may sometimes include abundant field horsetail, but usually includes sedges and grasses such as Emory's sedge, woolly sedge, marsh muhly (*Muhlenbergia racemosa*), prairie cordgrass, and the introduced redtop (*Agrostis gigantea*) or reed canarygrass (*Phalaris arundinacea*). Site on higher terraces in the west tend to be dominated by grasses such as western wheatgrass and green needlegrass (*Nassella viridula*) with scattered native forbs such as wild licorice. Eastward green needlegrass drops out and Canada wildrye is more common. More often than not, these higher sites are invaded by exotic grasses and forbs including smooth brome, intermediate wheatgrass (*Elymus hispidus*), Kentucky bluegrass, cheat (*Bromus* spp.), and noxious weeds such as leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), and Canada thistle (*Cirsium arvense*). Common buckthorn (*Rhamnus cathartica*) is also problematic at some sites.

Flooding often creates open patches in the herbaceous layer, which are available for colonization by nearby species. Because of the high permeability of the sandy floodplain soil, species typical of upland prairie may be present in addition to annual forbs of upland sites. Among the more common forbs are ragweeds (*Ambrosia artemisiifolia* and *A. psilostachya*), western sagewort (*Artemisia campestris* var. *caudata*), field sandbur (*Cenchrus longispinus*), spurges (*Euphorbia* spp.), curly-top gumweed (*Grindelia squarrosa*), plains sunflower

(*Helianthus petiolaris*), hairy golden-aster (*Heterotheca villosa*), and sand dropseed. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3

RANK JUSTIFICATION: This community is more extensive than it was prior to European settlement (particularly along the Platte and Republican Rivers) due to reduced river flows and elimination of bison herds and fire which formerly limited its extent. Many sites are badly overgrazed and invaded by exotic species.

GLOBAL RANK: G3G4

COMMENTS Though widespread, this community is very poorly studied in Nebraska. Here it is broadly defined to include NatureServe's *Populus deltoides* / *Carex pellita* Woodland, *Populus deltoides* / *Distichlis spicata* Woodland and *Populus deltoides* / *Panicum virgatum* – *Schizachyrium scoparium* Woodland, all of which have been reported as potentially occurring in Nebraska. Because of the degraded condition of most sites, it may be difficult to ascertain the presence of these different types.

An unusual wet phase of this community was observed along the White River at Fort Robinson in Dawes County. This site has a canopy of peachleaf willow 40-50 feet tall with a subcanopy of diamond willow 15 feet tall and a tall shrub layer of red osier and American currant to 6 and 4 feet, respectively. The understory is very disturbed and nearly consists of a near monoculture of reed canarygrass with late goldenrod (*Solidago gigantea*), woodbine (*Parthenocissus vitacea*) and scattered cattails (*Typha latifolia*), bordering a degraded wetland bottom. This community appears to be the western analogue of the eastern cottonwood-willow riparian woodland of eastern Nebraska.

EXEMPLARY SITES: Most sites observed are moderately to seriously degraded, and some sites along the White River at Fort Robinson State Park are typical.

REFERENCES:

- Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames, Iowa: 317pp.
- Lawrey, J. D. 1971. The Missouri River floodplain plant communities from Yankton, South Dakota, to Rulo, Nebraska: their successional and geographic relationships, and effects of river bank stabilization. M. A. thesis, University of South Dakota, Vermillion: 51pp.
- Rand, P. J. 1972. A survey of the phreatophytic trees of the Republican River valley in Nebraska. Unpublished report for the Water Resources Research Institute, University of Nebraska, Lincoln, Nebraska: 69pp.

EASTERN COTTONWOOD - DOGWOOD RIPARIAN WOODLAND

ELEMENT CODE: CEG000658

GLOBAL NAME: *Populus deltoides* – *Fraxinus pennsylvanica* Forest [provisional]

OTHER NAMES: *Populus-Cornus* community (Lawrey, 1971), Cottonwood –Dogwood Floodplain Woodland (Steinauer & Rolfsmeier 2000)

RANGE: This community occurs along the Missouri River from Washington County northward, and may also be present downstream, and along the lower Platte River.

ECOREGIONS: 47d, 47j?

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level ground in floodplains, low terraces, and old channels in broad river valleys. Soils are somewhat poorly to poorly drained sandy loams formed in alluvium. These sites are flooded occasionally to infrequently.

COWARDIN WETLAND SYSTEM: Palustrine forested, temporarily or intermittently flooded.

MOST ABUNDANT SPECIES:

Tree canopy: Plains cottonwood (*Populus deltoides*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*)

Vines: Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*)

Herbaceous: white snakeroot (*Ageratina altissima*), common scouringrush (*Equisetum hyemale*), sweet-scented bedstraw (*Galium triflorum*), Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), stinging nettle (*Urtica dioica*).

DIAGNOSTIC SPECIES: *Cornus drummondii*, *Equisetum hyemale*, *Populus deltoides*

VEGETATION DESCRIPTION: This community is dominated by a tall (to 30 m) overstory of cottonwood. The subcanopy is poorly developed and may contain widely scattered small trees of box-elder (*Acer negundo*), silver maple (*Acer saccharinum*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), or American elm (*Ulmus americana*), or be nearly absent. Occasionally subcanopy trees may be conspicuous along the margin of this community, especially the introduced white mulberry (*Morus alba*). A dense layer of roughleaf dogwood 2–4 m tall is a consistent feature of this community, and is usually the only significant shrub present, though in some sites prickly ash (*Zanthoxylum americanum*) may also be scattered or a sparse short shrub layer of coralberry (*Symphoricarpos orbiculatus*) is present. Vines are

sometimes conspicuous, with Virginia creeper and eastern poison ivy most common. The herbaceous understory in this community is sparse to moderate and defines the two subtypes:

- a) Common scouringrush subtype – in which the herbaceous stratum is a dense layer of common scouringrush with a few scattered forbs. This type generally occurs on lower, more poorly drained sites and has very low species diversity.
- b) Graminoid-forb – in which the understory is dominated by scattered graminoids (grasses and sedges) and forbs typical of riparian forest under the dense dogwood canopy. Younger, more open examples may contain species typical of floodplain grassland and floodplain woodland. This type is usually found on slightly higher ground and has low to moderate species diversity.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S2-S3

RANK JUSTIFICATION: Reduced water flows and channelization of rivers decreases the frequency of natural floods necessary for development and maintenance of this community. Agricultural development in floodplains further limits its extent.

GLOBAL RANK: G?

COMMENTS: Though this community is widespread and easily recognizable through its range, it has received little attention from ecologists. The graminoid-forb type, which is more common in the north part of the range, may be an early seral stage of Eastern Riparian Forest, and many of these sites will probably develop into this forest type with the elimination of frequent floods along the Missouri River. Tracts of young cottonwood woodland are present along the unchannelized portion of the Missouri River in Cedar and Dixon Counties (and sporadically downstream). They are often open and contain many small to medium-sized trees, with switchgrass (*Panicum virgatum*) dominating the understory. The *Populus* savanna community of Lawrey (1971) probably refers to such stands, which appear to be an early phase of this subtype.

The common scouringrush subtype, which is best developed downstream, may be a mature "pioneer woodland" that develops in areas currently (or formerly) prone to frequent flooding. Some stands at DeSoto Bend contain cottonwoods that are reaching maturity but do not appear to be succeeding to Eastern Floodplain Woodland, perhaps the very sandy soils of this community prevents establishment of a mixed-hardwood subcanopy. Both subtypes mix in places, and it is not unusual to see relict grassland species even in densely shaded examples of either. This community intergrades with the Eastern Riparian Forest and other woodland communities, and sometimes with Missouri River Dune Grassland, as well.

This very distinctive woodland was provisionally grouped into NatureServe's ill-defined *Populus deltoides* – *Fraxinus pennsylvanica* Forest in the 2000 classification, a northern forest type that may be present in northwest Nebraska. This community may be the southern counterpart of the *Populus deltoides* / *Cornus sericea* Forest.

EXEMPLARY SITES: DeSoto National Wildlife Refuge in Washington County.

REFERENCES:

Lawrey, J. D. 1971. The Missouri River floodplain plant communities from Yankton, South Dakota to Rulo, Nebraska: their successional relationships and effects of river bank stabilization. M. A. thesis, University of South Dakota, Vermillion: 52p.

EASTERN COTTONWOOD – WILLOW RIPARIAN WOODLAND

ELEMENT CODE: CEGLO0000I

GLOBAL NAME: None presently designated.

OTHER NAMES:

RANGE: This community is known from along the Missouri River, lower Platte River, and possibly the Elkhorn River in eastern Nebraska. It could occur along large tributaries westward.

ECOREGIONS: 47d, 47j?

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level ground in floodplains, especially along tributaries and large channels in broad river valleys. Soils are somewhat poorly to poorly-drained sandy loams formed in alluvium. These sites are flooded occasionally to seasonally.

COWARDIN WETLAND SYSTEM: Palustrine forested, temporarily or seasonally flooded.

MOST ABUNDANT SPECIES:

Tree canopy: Plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*)

Subcanopy: silver maple (*Acer saccharinum*), peachleaf willow, diamond willow (*Salix eriocephala*), white mulberry (*MORUS ALBA*)

Tall shrub: roughleaf dogwood (*Cornus drummondii*)

Herbaceous: white snakeroot (*Ageratina altissima*), Virginia wildrye (*Elymus virginicus*), wood nettle (*Laportea canadensis*), reed canarygrass (*PHALARIS ARUNDINACEA*), goldenglow (*Rudbeckia laciniata*), stinging nettle (*Urtica dioica*).

DIAGNOSTIC SPECIES: *Populus deltoides*, *Salix amygdaloides*

VEGETATION DESCRIPTION: The main canopy of this community tends to be fairly open, with scattered cottonwoods and large willows. A short (10-20 ft. tall) but often well-developed subcanopy is present that usually contains peachleaf willow and some mature diamond willows. Silver maple may be common in some sites, and the introduced white mulberry frequently

invades this community and is often the most common subcanopy tree in some degraded sites. The shrub layer is poorly developed and often consists of widely scattered patches of roughleaf dogwood. The herbaceous understory is very variable. In more open sites, white snakeroot, Virginia wildrye, muhlys (*Muhlenbergia* spp.), and American germander (*Teucrium canadense*) are among the most common herbaceous species. In more shaded sites wood nettle, stinging nettle and goldenglow are among the common native forbs. Most sites are moderately to severely infested by reed canarygrass, sometimes to the exclusion of nearly all other species. These degraded sites may additionally contain aggressive invaders such as garlic mustard (*Alliaria petiolata*) and ground ivy (*Glechoma hederacea*).

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S?

RANK JUSTIFICATION: This community is known from very few sites and is subject to degradation and succession in the absence of regular flooding.

GLOBAL RANK: G?

COMMENTS: This community tends to occur as a narrow band between shrubland and riparian woodland or forest, and frequently can be regarded as a part of a transitional boundary. In a few places, usually along watercourses in broad floodplains, it occurs as a distinctive broad band of woodland with a species composition unlike other riparian woodlands and wetlands. Only three of these larger sites have been recorded, though Lawrey (1971) and Vaubel (1975) mention this community elsewhere along the Missouri River. The best-preserved site seen is maintained by artificial seasonal flooding, and the lack of natural flooding due to channelization may contribute to the degraded conditions of other stands. This community and all willow-dominated woodlands are very poorly studied in Nebraska.

This community has the same canopy species as the western floodplain woodland, but differs in having a poorly-developed shrub layer and is usually more mesic, with a mix of wetland and woodland species in the herbaceous understory. A small peachleaf willow dominated woodland has been observed in the Nebraska Panhandle that seems similar in some respects. Other wooded wetland observed along the Missouri River may be related to this community. One site in a wet meadow at Indian Cave in Richardson County is dominated by a sparse canopy of sycamore (*Platanus occidentalis*) and honey locust (*Gleditsia triacanthos*), with a pronounced willow subcanopy. Another site in Neale Woods in Washington County contains an open canopy of dying cottonwoods and willows with a sparse subcanopy of American elm (*Ulmus americana*) and numerous sedges and hydrophytes in the herbaceous layer.

Eastern Cottonwood-Willow Riparian Woodland may intergrade with Eastern Cottonwood-Dogwood Riparian Woodland, Eastern Riparian Forest, Diamond Willow Woodland, and Sandbar Willow Shrubland, so it is likely that this community is more widespread and is overlooked. Some sites observed have a significant subcanopy layer and may qualify as forest, though the understory is usually so heavily infested with reed canarygrass it is hard to assess the natural vegetation. It is difficult to assign a global name at this time though

this community appears similar to the *Populus deltoides* – *Salix nigra* Forest (for shaded sites) or as a cottonwood dominated woodland (for open sites).

EXEMPLARY SITES: A fairly representative site is present at the Snyder-Winnebago Bends Wildlife Area in Thurston County.

REFERENCES:

Lawrey, J. D. 1971. The Missouri River floodplain plant communities from Yankton, South Dakota to Rulo, Nebraska: their successional relationships and effects of river bank stabilization. M. A. thesis, University of South Dakota, Vermillion: 52p.

Vaubel, J. A. 1975. Vegetation development in relation to age of river stabilization structures along a channelized segment of the Missouri River. M. A. thesis, University of South Dakota, Vermillion: 108pp.

DIAMOND WILLOW WOODLAND

ELEMENT CODE: CEGLO0000J

GLOBAL NAME: None presently designated.

OTHER NAMES:

RANGE: This community is known from along the Missouri, Middle Loup and Elkhorn Rivers and may also be present along the Platte and Niobrara Rivers.

ECOREGIONS: 27e, 27g?, 42p?, 47l, 47d 47j?

ENVIRONMENTAL DESCRIPTION: This community is found in floodplains of rivers and streams and on islands in rivers. Soils are sandy loams and loams formed in alluvium and are moderately or poorly drained.

COWARDIN WETLAND SYSTEM: Palustrine forested, temporarily flooded.

MOST ABUNDANT SPECIES:

Tree canopy: Plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), diamond willow (*Salix eriocephala*).

Tall shrub: roughleaf dogwood (*Cornus drummondii*), red osier (*Cornus sericea*), green ash (*Fraxinus pennsylvanica*) [saplings], wolfberry (*Symphoricarpos occidentalis*)

Vine: riverbank grape (*Vitis riparia*)

Herbaceous: hog peanut (*Amphicarpaea bracteata*), false nettle (*Boehmeria cylindrica*), sedges (*Carex emoryi* and others), field horsetail (*Equisetum arvense*), sweet-scented bedstraw (*Galium triflorum*), Kentucky bluegrass (*POA PRATENSIS*), goldenglow (*Rudbeckia laciniata*), Canada sanicle (*Sanicula canadensis*)

DIAGNOSTIC SPECIES: *Amphicarpaea bracteata*, *Boehmeria cylindrica*, *Carex emoryi*, *Desmodium paniculatum*, *Equisetum arvense*, *Rudbeckia laciniata*, *Salix eriocephala*

VEGETATION DESCRIPTION: Mature diamond willows are the dominant tree in this community, forming a dense and at times nearly impenetrable canopy 4–6 m tall. Young peachleaf willows are scattered among the diamond willow, and occasionally a few young cottonwoods are present. A sparse shrub layer of rough-leaf dogwood is usually present, with wolfberry also present at some sites. The herbaceous layer is dense and consists of mesophytic graminoids, chiefly sedges (*Carex emoryi*, most commonly), and sometimes also extensive stands of field horsetail. Numerous forbs are usually present and generally no single species dominates the understory. Species diversity is relatively high.

OTHER NOTEWORTHY SPECIES: *Geum laciniatum* is present in this community in Howard County.

STATE RANK: S?

RANK JUSTIFICATION: Relatively few well-developed examples of this community have been located and further survey work is needed to determine its full extent in the State.

GLOBAL RANK: G?

COMMENTS: This community occurs as a band in floodplains, usually between Sandbar Willow Shrubland and other riparian woodland communities and may be a transitional phase, though sandbar willow is rarely present in this community, and cottonwoods, while occasionally present, never dominate. The high species diversity suggests that some stands may be fairly mature. All Nebraska sites sampled so far have panicked tick-clover, including sites far west of the main range of this species in central Nebraska. This community might be a seral stage of the Eastern Cottonwood-Willow Riparian Woodland, and at least one site studies seems transitional to that type. It has been previously grouped with the western riparian woodland community in the NatureServe classification, but no sites associated with that community have been found in Nebraska.

Currier (1982) mentions diamond willow as common in some woodland communities along the Platte River, but does not recognize it as a community. Morrison (1935) reported stands dominated by *Salix eriocephala* in the Platte River channel in eastern Nebraska, which may be synonymous with this community, though many open stands, especially westward, may be more similar to sandbar willow shrubland in species composition. Shrublands containing young diamond willows are known westward, but they do not tend to develop distinct canopy and shrub layers as is typical in eastern sites. It should not be assumed all patches of diamond willow necessarily represent this community.

Harvesting of diamond willow stems by crafts enthusiasts could impact this community. The best-developed sites are in relatively inaccessible areas. Many stands along the channelized portion of the Missouri River are dying out and being overtaken by woodland vegetation, suggesting that flooding is necessary to maintain this community.

EXEMPLARY SITES: Representative examples can be found at Loup Junction Wildlife Management Area in Howard County and Yellowbanks Wildlife Management Area in Madison County.

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames, Iowa: 317pp.

Morrison, J. L. 1935. The development and structure of the vegetation on the sandbars and islands in the lower Platte River. M. A. thesis, University of Nebraska-Lincoln: 72pp.

UPLAND WOODLANDS

PONDEROSA PINE WOODLAND

ELEMENT CODE: CEGl000201

GLOBAL NAME: *Pinus ponderosa* / *Schizachyrium scoparium* Woodland

OTHER NAMES: Pine savanna (Kantak, 1995); Ponderosa pine / Little bluestem woodland.

RANGE: This community occurs in the Pine Ridge escarpment in Dawes, Sheridan and Sioux counties in northwest Nebraska, and along the Niobrara River in Brown, Cherry, and Keya Paha counties. It is present to a lesser extent in the Wildcat Hills in Banner and Scotts Bluff counties, and may occur along the south periphery of the Sandhills in central Nebraska.

ECOREGIONS: 25a, 25d, 25f, 27e?, 43r

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes (5–40%) on south and west facing slopes and upper north and east facing slopes in the Pine Ridge escarpment, along the Niobrara River, and in the Wildcat Hills. Soils are well-drained fine sandy loams formed in weathered sandstone or eolian sand.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: Ponderosa pine (*Pinus ponderosa*)

Shrub: skunkbrush sumac (*Rhus aromatica*), Arkansas rose (*Rosa arkansana*), wolfberry (*Symphoricarpos occidentalis*)

Herbaceous: big bluestem (*Andropogon gerardii*), white sage (*Artemisia ludoviciana*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), threadleaf sedge (*Carex filifolia*), sun sedge (*Carex heliophila*), western wheatgrass (*Elymus smithii*), slender wheatgrass (*Elymus trachycaulus*), needle-and-thread (*Hesperostipa comata*), Kentucky bluegrass (*POA PRATENSIS*), little bluestem (*Schizachyrium scoparium*), rough heath aster (*Symphotrichum falcatum*), buckbean (*Thermopsis rhombifolia*), yucca (*Yucca glauca*)

DIAGNOSTIC SPECIES: *Carex heliophila*, *Pinus ponderosa*, *Schizachyrium scoparium*, *Symphoricarpos occidentalis*

VEGETATION DESCRIPTION: This community has an open canopy of Ponderosa pine with Rocky Mountain red cedar (*Juniperus scopulorum*) or eastern red cedar (*J. virginiana*) sometimes present, but never abundant. A shrub layer may be scattered to extensive, consisting of skunkbrush sumac, Arkansas rose, western wild rose (*Rosa woodsii*) and wolfberry on lower slopes. Yucca (*Yucca glauca*) is sometimes present. In well-preserved sites, herbaceous cover is mostly of short to mid grasses and sedges, with little bluestem often common in more open sites, and sun sedge abundant where tree cover is greater. Kentucky bluegrass frequently dominates the understory of disturbed sites. Other frequent graminoids include big bluestem and sand bluestem (*Andropogon gerardii* and *A. hallii*), prairie sandreed, slender wheatgrass, green needlegrass (*Nassella viridula*), western wheatgrass, and needle-and-thread. Forb species are those common in western prairie, such as pasque-flower (*Anemone patens*), white sage, rough heath aster, purple coneflower (*Echinacea angustifolia*) and dotted gayfeather (*Liatris punctata*). Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Rattlesnake plantain (*Goodyera oblongifolia*) was found once in moderately open pine woods in Dawes County and is probably more widespread. White-scale sedge (*Carex xerantica*) and pinedrops (*Pterospora andromedea*) are occasionally found in this community.

STATE RANK: S3S4

RANK JUSTIFICATION: Pine woodland is fairly widespread in the Pine Ridge district of the Nebraska National Forest, but certain portions are threatened by timber cutting. Kentucky bluegrass has extensively invaded many sites.

GLOBAL RANK: G3G4

COMMENTS: As currently defined, this community is heterogeneous and may need to be split. Many Nebraska sites described as Ponderosa pine - little bluestem woodland are essentially wooded prairie communities in which the understory consists almost entirely of species from surrounding grassland. Sites on more protected exposures may have mostly grassland species on upper slopes and a mixture of grassland and woodland species below. Among the woodland

elements are northern pussytoes (*Antennaria howellii*), harebell (*Campanula rotundifolia*), mouse-ear chickweed (*Cerastium arvense*), smooth blue aster (*Symphyotrichum laeve*), Oregon woodsia (*Woodsia oregana*), and occasionally the low shrubs Oregon grape (*Berberis repens*) and dwarf juniper (*Juniperus communis*). These sites may be equivalent to TNC's *Pinus ponderosa* / *Carex inops* ssp. *heliophila* Woodland. More studies are needed to better define Nebraska's pine woodland communities.

In the Niobrara Valley, bur oak and other eastern deciduous forest elements are often present in this community. At current these sites are considered transitional between pine woodland and bur oak woodland, but may deserve recognition as a separate community because of their dissimilarity to pine woodlands of the Panhandle.

In the Panhandle, this community usually occurs in association with Ponderosa Pine Forest, which has likely become more common and difficult to distinguish from woodland as a result of fire suppression. Fire probably also limited the extent of pine woodland as well, but it was probably not rare prior to European settlement. On steep north slopes that contained pine woodland prior to the 1989 fire at Fort Robinson, the woodland understory species still persist, and pine regeneration is often fairly high in these sites.

EXEMPLARY SITES: The Niobrara Valley Preserve in Keya Paha County, Metcalf Wildlife Management Area in Sheridan County, Fort Robinson State Park in Sioux County

REFERENCES:

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara Valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

Nixon, E. S. 1967. A vegetational study of the pine ridge of northwestern Nebraska. *The Southwestern Naturalist* 12:134–145.

Tolstead, W. L. 1947. Woodlands in northwestern Nebraska. *Ecology* 28:180–188.

GREEN ASH – ELM CANYON BOTTOM WOODLAND

ELEMENT CODE: C EGL000643

GLOBAL NAME: *Fraxinus pennsylvanica* - *Ulmus americana* / *Prunus virginiana* Woodland

OTHER NAMES: Deciduous woods (Tolstead, 1947); Green Ash - Elm Canyon Floodplain Woodland, Northwestern Canyon Bottom Deciduous Woodland

RANGE: This community is found in areas of well-developed pine-wooded escarpments in the Pine Ridge and to a lesser extent in the Wildcat Hills. It may also be present along the Niobrara River, and in deep juniper-wooded canyons along the North Platte River and in the Loup River drainage.

ECOREGIONS: 25a, 25f

ENVIRONMENTAL DESCRIPTION: This community occurs on low slopes and narrow bottoms of ravines and canyons primarily in pine-wooded escarpments. Soils are deep and moderately well drained sandy loams formed in weathered sandstone and colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: box-elder (*Acer negundo*), hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*)

Shrub: wild plum (*Prunus americana*), chokecherry (*P. virginiana*), buffalo currant (*Ribes aureum*), northern gooseberry (*R. oxycanthoides*), western wild rose (*Rosa woodsii*), wolfberry (*Symphoricarpos occidentalis*)

Short Shrub: Oregon grape (*Berberis repens*), dwarf juniper (*Juniperus communis*), western poison ivy (*Toxicodendron rydbergii*)

Vine: bittersweet (*Celastrus scandens*), woodbine (*Parthenocissus vitacea*), riverbank grape (*Vitis riparia*)

Herbaceous: wild columbine (*Aquilegia canadensis*), common wood sedge (*Carex blanda*), longbeak sedge (*C. sprengelii*), hairy wildrye (*Elymus villosus*), northern bedstraw (*Galium boreale*), sweet-scented bedstraw (*G. triflorum*), wild bergamot (*Monarda fistulosa*), Kentucky bluegrass (*POA PRATENSIS*), purple meadow-rue (*Thalictrum dasycarpum*)

DIAGNOSTIC SPECIES: *Actaea rubra*, *Agastache foeniculum*, *Betula occidentalis*, *Bromus marginatus*, *Carex sprengelii*, *Fraxinus pennsylvanica*, *Galium boreale*, *Hackelia floribunda*, *Populus tremuloides*, *Ribes oxycanthoides*, *Ulmus americana*

VEGETATION DESCRIPTION: The dominant trees of this community include green ash and American elm, with box-elder present in more mesic sites. Hackberry is common locally. The subcanopy, when present, consists of the same species, though rarely mountain birch (*Betula occidentalis*) or quaking aspen (*Populus tremuloides*) may be present. Shrubs include wild plum and northern gooseberry (in the Pine Ridge), in addition to those present in pine forest such as chokecherry and buffalo currant. Less common shrubs include false indigobush (*Amorpha fruticosa*), red osier (*Cornus sericea*), fleshy hawthorn (*Crataegus succulenta*), smooth sumac (*Rhus glabra*), American currant (*Ribes americanum*), and black raspberry (*Rubus occidentalis*). A short shrub layer of western poison ivy is often present, and in richer sites dwarf juniper and Oregon grape are present as well. Riverbank grape is the most common vine. The herbaceous layer is rich in species and is often dominated by woodland graminoids such as longbeak sedge and hairy wildrye in undisturbed sites. Kentucky bluegrass is a common invader that dominates most grazed sites. Common forbs include an array of eastern deciduous forest species of the northeast United States, including wild columbine, northern bedstraw, wild bergamot, black snakeroot (*Sanicula marilandica*) and purple meadow rue. Some species typical of the Rocky Mountains are may be present, but are often not as common, including many-flower stickseed

(*Hackelia floribunda*) and veiny meadow rue (*Thalictrum venulosum*). Species diversity is relatively high in undisturbed sites.

OTHER NOTEWORTHY SPECIES: Species in this community uncommon in Nebraska include *Arabis glabra*, *Betula occidentalis*, *Bromus marginatus*, *Corallorhiza maculata*, *Delphinium nuttallianum*, *Erigeron subtrinervis*, *Hackelia floribunda*, *Lathyrus ochroleucus*, *Platanthera aquilonis*, *Populus tremuloides*, *Prenanthes racemosa*, *Thalictrum dioicum*, and *T. venulosum*.

STATE RANK: S2

RANK JUSTIFICATION: Though fairly extensive in the Pine Ridge, this community type is heavily impacted by cattle grazing and well-preserved sites are increasingly uncommon.

GLOBAL RANK: G2G3

COMMENTS: This community differs from similar ones in the Black Hills by the absence of a subcanopy of ironwood (*Ostrya virginiana*) and other floristic differences. Most sites have been heavily grazed in the past and are frequently dominated by Kentucky bluegrass with few associated species. High-quality sites are usually restricted to steep lower slopes in deep canyons and frequently do not extend far from the base of the slope, where it is commonly replaced by exotic grasses. This community may intergrade with the Ponderosa Pine Forest, and it is not unusual for a few large pines to be present in the community, as well as pine forest understory species.

EXEMPLARY SITES: Gilbert-Baker Wildlife Management Area in Sioux County, Chadron State Park and scattered areas in the Pine Ridge Unit of the Nebraska National Forest in Dawes County.

REFERENCES:

Nixon, E. S. 1967. A vegetational study of the Pine Ridge of Northwestern Nebraska. *Southwestern Naturalist* 12:134–145.

Tolstead, W. L. Woodlands in northwestern Nebraska. *Ecology* 28:180–188.

MIXED CONIFER WOODLAND

ELEMENT CODE: CEGL000861

GLOBAL NAME: *Pinus ponderosa* / *Juniperus scopulorum* Woodland

OTHER NAMES: Pine/Juniper Community (Kantak, 1995); Ponderosa Pine/Rocky Mountain Juniper Woodland

RANGE: This community occurs in the Panhandle from the Wildcat Hills southward in Banner, Cheyenne, Kimball, Morrill, and Scotts Bluff counties, and along the Niobrara River in Brown, Cherry, and Keya Paha counties.

ECOREGIONS: 25f, 43r

ENVIRONMENTAL DESCRIPTION: This community occurs on moderate to steep slopes (15-45%) usually on the north sides of escarpments. Soils are shallow well-drained loamy sands with rocks, and are formed in colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: Ponderosa pine (*Pinus ponderosa*)

Subcanopy: Rocky Mountain red cedar (*Juniperus scopulorum*), eastern red cedar (*Juniperus virginiana*)

Shrub: chokecherry (*Prunus virginiana*), skunkbrush sumac (*Rhus aromatica*)

Short Shrub: western poison ivy (*Toxicodendron rydbergii*)

Herbaceous: northern pussytoes (*Antennaria howellii*), sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), threadleaf sedge (*Carex filifolia*), sun sedge (*C. heliophila*), Rocky Mountain sedge (*C. saximontana*), thickspike wheatgrass (*Elymus lanceolatus*), starry false Solomon's-seal (*Smilacina stellata*), littleseed ricegrass (*Piptatherum micranthum*), Kentucky bluegrass (*POA PRATENSIS*), buckbean (*Thermopsis rhombifolia*)

DIAGNOSTIC SPECIES: *Juniperus scopulorum*, *J. virginiana*, *Piptatherum micranthum*, *Pinus ponderosa*

VEGETATION DESCRIPTION: Tree canopy is fairly open and 10-20 m tall, and consists mostly of scattered Ponderosa pines. A 2-4 m tall subcanopy of Rocky Mountain red cedar or eastern red cedar is present and may be sparse to fairly dense. Hardwoods may be scattered in the subcanopy, including green ash (*Fraxinus pennsylvanica*), with bur oak (*Quercus macrocarpa*) also present in the Niobrara River valley. Where juniper cover is not dense, a shrub layer of skunkbrush sumac and chokecherry is commonly present, with mountain mahogany (*Cercocarpus montanus*) and western red currant (*Ribes cereum*) common at some sites in the Wildcat Hills, and Saskatoon serviceberry (*Amelanchier alnifolia*) locally common in the Niobrara Valley. The herbaceous understory is typical of surrounding upland prairie, and may become very sparse to nearly absent as the density of the subcanopy increases. Common graminoids include blue grama, sideoats grama, Kentucky bluegrass and threadleaf sedge in open woods. In areas with dense juniper cover, littleseed ricegrass and sun sedge may dominate. Frequent forbs include northern pussytoes, buckbean, starry false Solomon's seal, and forbs typical of surrounding prairie communities. Species diversity is relatively low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species possible in this community include Ross' sedge (*Carex rossii*), blue larkspur (*Delphinium nuttallianum*), and pinedrops (*Pterospora andromedea*).

STATE RANK: S3

RANK JUSTIFICATION: This community is rather widespread in the Wildcat Hills. It is likely more widespread today due to fire suppression than it was prior to European settlement. Most sites are grazed, and Kentucky bluegrass often dominates the understory of more open sites.

GLOBAL RANK: G4

COMMENTS: In places where the pine canopy is relatively sparse, this community grades into Mountain Mahogany Shrubland, Juniper Woodland, and mixed-grass prairie communities. In deep draws, it may grade into Ponderosa Pine Forest. This community may represent a late seral stage and fire could modify the community to Ponderosa Pine Woodland or some other community. In general, this community is less diverse than pine woodland, but tends to contain woodland species in addition to grassland plants due to the denser canopy coverage. Sites in the Niobrara Valley may be separable as a different community type.

EXEMPLARY SITES: The Niobrara Valley Preserve in Brown, Cherry, and Keya Paha counties, and Scotts Bluff National Monument and Wildcat Hills State Recreation Area in Scotts Bluff County

REFERENCES:

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

The Nature Conservancy. 1995. Vegetation classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.

JUNIPER WOODLAND

ELEMENT CODE: CEGl000747

GLOBAL NAME: *Juniperus scopulorum* / *Piptatherum micranthum* Woodland

OTHER NAMES: Closed-canopy juniper groves (Kaul *et al.*, 1983); Rocky Mountain Juniper / Littleseed Ricegrass Woodland.

RANGE: This community occurs primarily in central and western Nebraska, but may be scattered in northeast Nebraska.

ECOREGIONS: 25a, 25f, 27b, 27e, 42p, 42g, 44a, 47k?

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to relatively steep slopes on predominately north-facing slopes of bluffs, hills, canyons, ravines, and escarpments. Soils are shallow, rapidly drained, poorly developed loamy sands, loams, and silt loams formed in loess and colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Tree canopy: Rocky Mountain red cedar (*Juniperus scopulorum*), eastern red cedar (*Juniperus virginiana*) and introgressant hybrids.

Shrub: skunkbrush sumac (*Rhus aromatica*), buffalo currant (*Ribes aureum*), western poison ivy (*Toxicodendron rydbergii*).

Herbaceous: Fremont goosefoot (*Chenopodium fremontii*), littleseed ricegrass (*Piptatherum micranthum*), Pennsylvania pellitory (*Parietaria pensylvanica*)

DIAGNOSTIC SPECIES: *Chenopodium fremontii*, *Juniperus scopulorum*, *J. virginiana*, *Piptatherum micranthum*.

VEGETATION DESCRIPTION: This community is usually dominated by a moderate to dense canopy of juniper 4–6 m tall. In some places scattered Ponderosa pine (*Pinus ponderosa*) may be present. Where canopy cover is moderate, herbaceous and shrubby prairie species are scattered in the understory. Most frequent shrubs include chokecherry (*Prunus virginiana*), skunkbrush sumac, and buffalo currant. Where cover is dense, the understory is sparse to nearly absent and consists of patches of littleseed ricegrass and shade-tolerant native annuals such as Fremont goosefoot, maple-leaf goosefoot (*Chenopodium simplex*) and Pennsylvania pellitory and a sparse short shrub layer of western poison ivy. Remnant prairie species such as pasque-flower (*Anemone patens*) are often present, but rarely flower in the dense shade. Much of the groundlayer is covered by a frequently thick layer of fallen needles and is unvegetated. Species diversity is low.

OTHER NOTEWORTHY SPECIES: Purple cliff-brake (*Pellaea atropurpurea*) is known from this community in Keith County.

STATE RANK: S4S5

RANK JUSTIFICATION: This community is expanding from its native range due to fire suppression. Grazing tends to eliminate the herbaceous understory (Kaul *et al.*, 1983).

GLOBAL RANK: G3G4

COMMENTS: In Garden and Keith Counties, the dominant trees in this community are intermediate between *Juniperus scopulorum* and *J. virginiana*. Eastward, this community occurs

as isolated patches on upper bluff slopes associated with deciduous forest. Westward, it is usually associated with pine woodland. This community is likely far more common than it was prior to European settlement, but apparently existed in deep canyons prior to fire suppression. It is possible that more open phases of this community may represent TNC's *Juniperus scopulorum* / *Schizachyrium scoparium* woodland.

EXEMPLARY SITES: Relatively undisturbed sites are found extensively in the vicinity of Cedar Point Biological Station in Keith County and along the Dismal River in Hooker and Thomas counties.

REFERENCES:

Kaul, R. B., Challaiah, and K. H. Keeler. 1983. Effects of grazing and juniper-canopy closure on the prairie flora in Nebraska high-plains canyons. Proceedings of the Seventh North American Prairie Conference (1980):95-105.

The Nature Conservancy. 1995. Vegetation classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.

OAK WOODLAND

ELEMENT CODE: CEGl002053

GLOBAL NAME: *Quercus macrocarpa* / *Andropogon gerardii* - *Hesperostipa spartea* Woodland

OTHER NAMES: *Quercus macrocarpa*-*Hicoria cordiformis* association (Aikman, 1929); Bur oak-yellow oak association (Costello, 1931); Eastern Great Plains Bur Oak Woodland

RANGE: This community occurs mainly in the east half of the state, though it extends slightly westward along the Niobrara River, and occurs in Hitchcock County.

ECOREGIONS: 27, 42, 43i, 43r, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes of various aspect and is usually associated with stream valleys. Soils are well-developed and well-drained silt loams and sandy loams formed mostly in loess and glacial till, sometimes in limestone or sandstone.

MOST ABUNDANT SPECIES:

Tree Canopy: bur oak (*Quercus macrocarpa*)

Sub-canopy: eastern red cedar (*Juniperus virginiana*)

Shrub: roughleaf dogwood (*Cornus drummondii*), American hazelnut (*Corylus americana*), wild plum (*Prunus americana*), chokecherry (*Prunus virginiana*), smooth sumac (*Rhus glabra*), Missouri gooseberry (*Ribes missouriense*), wolfberry (*Symphoricarpos occidentalis*), coralberry (*S. orbiculatus*), prickly-ash (*Zanthoxylum americanum*)

Vine: bittersweet (*Celastrus scandens*), Virginia creeper (*Parthenocissus quinquefolia*), woodbine (*P. vitacea*), greenbriar (*Smilax hispida*), eastern poison ivy (*Toxicodendron radicans*), riverbank grape (*Vitis riparia*)

Herbaceous: big bluestem (*Andropogon gerardii*), smooth brome (*BROMUS INERMIS*), short-beak sedge (*Carex brevior*), sun sedge (*C. heliophila*), porcupine grass (*Hesperostipa spartea*), wild bergamot (*Monarda fistulosa*), Kentucky bluegrass (*POA PRATENSIS*), little bluestem (*Schizachyrium scoparium*), starry false Solomon's-seal (*Smilacina stellata*), Canada goldenrod (*Solidago canadensis*)

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Quercus macrocarpa*, *Schizachyrium scoparium*

VEGETATION DESCRIPTION: The canopy of this community consists of moderate cover of bur oak, though scattered trees of green ash (*Fraxinus pennsylvanica*) and elms (*Ulmus* spp.) are frequently present. Where this community occurs at the edge of upland forest along the Missouri River, chinkapin oak (*Quercus muehlenbergii*) may be as common as bur oak, and bitternut hickory (*Carya cordiformis*) may also be present. Honey locust (*Gleditsia triacanthos*) may be a common constituent of this community in southern Nebraska. Openings among the oak are frequently filled by eastern red cedar, and shrubs may be common where cedars are not as dense, with wolfberry, coralberry, chokecherry, and roughleaf dogwood the common species. Remnant patches of wild plum (*Prunus americana*) and smooth sumac (*Rhus glabra*) are sometimes present where the canopy is more open. Herbaceous understory is often sparse when the subcanopy or shrub layers are dense, but in sites where the woody understory is occasionally removed by fire or grazing, prairie species such as big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*) are present along with woodland species. Smooth brome and Kentucky bluegrass commonly invades more open sites to the exclusion of the natives. In sites that do not border forests, lower slopes may be dominated by species typical of forests, such as Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), white snakeroot (*Ageratina altissima*), nodding fescue (*Festuca subverticillata*), and sweet-scented bedstraw (*Galium triflorum*). Patches of prairie grasses and shrubs are usually scattered on upper slopes. Where it borders forest, this community may often occur as a narrow to broad ecotone with upland shrubland. In southeast Nebraska, species associated with open woodland and savanna in states to our east may be present, which sometimes persist as the canopy cover increases in the absence of fire. Many of these are among the noteworthy species listed below. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species likely to be present in this community include *Arnoglossum atriplicifolium*, *Asclepias purpurascens*, *Dasistoma macrophylla*, *Desmodium sessilifolium*, *Eragrostis capillaris*, *Erythronium mesochoreum*, *Hedeoma pulegioides*, *Helianthemum bicknellii*, *Hypericum pyramidatum*, *H. sphearocarpum*, *Lechea*

tenuifolia, *Lespedeza violacea*, *Malus ioensis*, *Melica nitens*, *Panicum depauperatum*, *Paronychia canadensis*, *Quercus marilandica*, *Q. prinoides*, *Ruellia strepens*, *Trichostema brachiata*, *Viola pedata* and *V. viarum*.

STATE RANK: S1S2

RANK JUSTIFICATION: Most remaining sites have become extensively invaded by eastern red cedar or shrubs, and exotic grasses such as Kentucky bluegrass or smooth brome. Fire suppression has resulted in succession to closed canopy forest in some cases.

GLOBAL RANK: G2G3

COMMENTS: No extensive stands of this community are known in the State, though bur oak dominated uplands with dense red cedar in the subcanopy are not uncommon in extreme north and northeast Nebraska. It is sometimes difficult to distinguish such communities from juniper-infested forest, though usually the cedar subcanopy is not as dense in forest. Because of the scarcity of well-preserved upland bur oak forest, the correct application of the NatureServe name is based on conjecture, and it is possible more than one type of upland oak woodland is present in the state.

More open phases of this community called oak savanna may have existed in portions of extreme east and southeast Nebraska (Rozmajzl, 1988), usually on upland slopes associated with forested draws. It does not maintain its character in the absence of fire, and is probably not extant in Nebraska, though some of the species indicative of those habitats still persist in places. Southward, this community seems to be restricted to very sandy or rocky soils and is currently known from rocky sites in the extreme south. Oak woodlands associated with sandstone outcrops in Pawnee and Richardson Counties have unique species such as *Quercus marilandica* and *Q. prinoides* and may be separable as a subtype (cf. Reynolds, 1942). Additionally a bur oak – shagbark hickory (*Carya ovata*) forest that appears to be a closed canopy phase of a bur oak woodland has been recorded from Richardson County. Additional surveys are needed to determine the full extent and variation of this community in Nebraska.

EXEMPLARY SITES: Somewhat representative occurrences are present at Rock Creek Station State Historical Park and Rock Glen Wildlife Management Area in Jefferson County.

REFERENCES:

- Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. Botanical Seminar, University of Nebraska Botanical Survey, New Series 5:1–75.
- Costello, D. F. 1931. Comparative study of river bluff succession on the Iowa and Nebraska sides of the Missouri River. Botanical Gazette 91:295–307.
- Reynolds, H. C. 1942. Flora of Richardson County, Nebraska. M.S. thesis, University of Nebraska-Lincoln: 115pp.

Rozmajzl, M. K. 1988. Presettlement savanna in eastern Nebraska. M.A. thesis, University of Nebraska at Omaha: 42pp.

WETLAND SHRUBLANDS

SANDBAR WILLOW SHRUBLAND

ELEMENT CODE: C EGL001203, C EGL008562

GLOBAL NAME: *Salix exigua* / Mesic Graminoid Shrubland, *Salix interior* Temporarily Flooded Shrubland

OTHER NAMES: Willow shrubland; willow wetland zone, willow shrubland zone, false indigobush/willow shrubland (Currier, 1982).

RANGE: This community is found primarily along rivers and larger streams throughout the State.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community is found on sandbars, islands, and shorelines in stream channels, and occasionally in floodplain terraces or below grassland seeps in uplands. The soils are poorly-developed and consist primarily of sand (though silt, clay or gravel may be present to a lesser extent), and are formed in recently deposited alluvium. Drainage varies with height of the community above the water surface.

COWARDIN WETLAND SYSTEM: Palustrine scrub-shrub temporarily and seasonally flooded.

MOST ABUNDANT SPECIES:

Shrub: false indigobush (*Amorpha fruticosa*), red osier (*Cornus sericea*), Plains cottonwood (*Populus deltoides*) [saplings], peachleaf willow (*Salix amygdaloides*) [saplings], diamond willow (*S. eriocephala*), sandbar willow (*S. exigua* var. *sericans*).

Herbaceous: redbud (*AGROSTIS GIGANTEA*), common ragweed (*Ambrosia artemisiifolia*), Emory's sedge (*Carex emoryi*), woolly sedge (*C. pellita*), bald spikerush (*Eleocharis erythropoda*), common scouringrush (*Equisetum hyemale*), rice cutgrass (*Leersia oryzoides*), common water-horehound (*Lycopus americanus*), sweetclovers (*MELILOTUS* spp.), reed canarygrass (*PHALARIS ARUNDINACEA*), northern fog-fruit (*Phyla lanceolata*), smartweeds (*Polygonum* spp.), goldenrods (*Solidago* spp.), docks (*Rumex* spp.), three-square bulrush (*Schoenoplectus pungens*), prairie cordgrass (*Spartina pectinata*), paniced aster (*Symphotrichum lanceolatum*), stinging nettle (*Urtica dioica*)

DIAGNOSTIC SPECIES: *Salix exigua* var. *sericans*

VEGETATION DESCRIPTION: The vegetation of this community is dominated by shrubs and sapling trees 2–4 m tall with sandbar willow (*Salix exigua* var. *sericans*) the dominant species, sometimes with lesser amounts of diamond willow and red osier. False indigobush is often present, and may be somewhat common on mesic (rather than wet) ground. The understory is highly variable due to the early successional nature of the community and may consist of bare sand, annuals, or perennial hydrophytes. In wetter sites, perennial hydrophytes such as Emory's sedge, common water-horehound and spikerushes may be common. On slightly higher ground, prairie cordgrass, common scouringrush, paniced aster, northern fog-fruit, and goldenrods are present. In some mature mesic sites, a distinct canopy may develop and a mixture of herbaceous woodland plants and hydrophytes may occur. On the driest sites, plants typical of disturbed floodplain terraces, such common ragweed and cheat grasses (*Bromus* spp.) may be scattered. On some frequently inundated sites, scattered hydrophytic annuals may occur. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S4S5

RANK JUSTIFICATION: These sites are quite abundant along many rivers throughout the State, but may be decreasing or even absent from channelized streams.

GLOBAL RANK: G5

COMMENTS: Because of its successional nature, this community is relatively short-lived (10–20 years) before succeeding to riparian woodland. Some exceptionally mature stands may contain woodland understory species, but tend not to develop a shrub layer typical of Diamond Willow Woodland. This community may occur as an open patch type in the Perennial Sandbar community, and sites on higher ground may intergrade with Riparian Dogwood-False Indigobush Shrubland. Currier (1982) recognized three highly overlapping subtypes along the Platte, but these do not encompass the entire range of variation within the community throughout the state.

EXEMPLARY SITES: Many sites are present along the Loup and Platte Rivers.

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Unpublished Ph.D. dissertation, Iowa State University, Ames, Iowa. 317pp.

Morrison, J. L. 1935. The development and structure of the vegetation on the sandbars and islands in the lower Platte River. M. A. thesis, University of Nebraska, Lincoln, Nebraska. 72pp.

Vaubel, J. A. 1975. Vegetation development in relation to age of river stabilization structures along a channelized segment of the Missouri River. Unpublished Ph.D. dissertation, University of South Dakota, Vermillion, South Dakota. 108pp.

Wilson, R. E. 1970. Succession in stands of *Populus deltoides* along the Missouri River in southeastern South Dakota. *The American Midland Naturalist* 83:330–342.

RIPARIAN DOGWOOD-FALSE INDIGOBUSH SHRUBLAND

ELEMENT CODE: CEGL005220

GLOBAL NAME: *Cornus drummondii* – *Amorpha fruticosa* – *Cornus sericea* Shrubland

OTHER NAMES: *Amorpha/Cornus*, *Cornus/Amorpha* communities (Currier, 1982)

RANGE: This community is found along rivers and streams in the eastern half of the State, but is likely scattered westward.

ECOREGIONS: 27, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on high banks and raised islands, and occasionally on terraces above stream channels. Soils are moderately well drained and formed in alluvium. These sites are periodically flooded in the late winter and early spring.

COWARDIN WETLAND SYSTEM: Palustrine scrub-shrub, intermittently flooded

MOST ABUNDANT SPECIES:

Shrub: false indigobush (*Amorpha fruticosa*), roughleaf dogwood (*Cornus drummondii*), red osier (*Cornus sericea*), Plains cottonwood (*Populus deltoides*) [saplings], sandbar willow (*Salix exigua* var. *sericans*)

Herbaceous: annual ragweed (*Ambrosia artemisiifolia*), Emory's sedge (*Carex emoryi*), woolly sedge (*C. pellita*), orange jewelweed (*Impatiens capensis*), switchgrass (*Panicum virgatum*), reed canarygrass (*PHALARIS ARUNDINACEA*), northern fog-fruit (*Phyla lanceolata*), Kentucky bluegrass (*POA PRATENSIS*), prairie cordgrass (*Spartina pectinata*)

DIAGNOSTIC SPECIES: *Amorpha fruticosa*, *Cornus drummondii*, *C. sericea*

VEGETATION DESCRIPTION: This community consists of patches with moderate to locally dense cover of broadleaf shrubs 2–3 m tall dominated by false indigobush and roughleaf or red osier dogwood. Occasional patches of sandbar willow and cottonwood saplings may also be present. Herbaceous understory varies in response to depth to water and flooding, and may include sedges such as *Carex cristatella*, *C. emoryi*, and *C. pellita*, and mesophytic grasses such as switchgrass and prairie cordgrass. In more xeric sites, weedy annual forbs such as ragweed may be abundant, whereas wetter sites are dominated by forbs typical of marshes (such as orange jewelweed and field mint [*Mentha arvensis*]). A short shrub layer of western poison ivy (*Toxicodendron rydbergii*) is present in some places. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: *Geum laciniatum* has been found in this community in Howard County.

STATE RANK: S4?

RANK JUSTIFICATION: The full extent of this community is unknown, but it appears to expand and thrive where frequency of flooding has decreased, and is becoming quite common along the Platte River.

GLOBAL RANK: GU

COMMENTS: This community type is poorly studied and not currently well-defined. It is based on the work of Currier (1982) who described it as a riparian shrubland that mostly occupied sites on higher ground than Sandbar Willow Shrubland. Some sites surveyed along the Middle Loup River are far wetter than those described by Currier, often wetter even than most examples of Sandbar Willow Shrubland, and may be intermediate with the Marsh Seep community. Drier phases are similar in some respect to upland Sumac-Dogwood Shrubland community, which is usually associated with upland woods, but can occur on high river terraces as well and differs mostly in the absence of false indigobush. Still other sites may represent part of the tall shrub layer of the Western Riparian Woodland. Further analysis of this and all other riparian shrubland communities is needed.

EXEMPLARY SITES: Few sites of high quality are known, the best and most extensive being along the Loup and Platte Rivers.

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames: 317pp.

UPLAND SHRUBLANDS

MOUNTAIN MAHOGANY SHRUBLAND

ELEMENT CODE: CEG001086

GLOBAL NAME: *Cercocarpus montanus* / *Bouteloua curtipendula* Shrubland

OTHER NAMES: Mountain Mahogany/Sideoats Grama Shrubland

RANGE: This community occurs primarily in the Wildcat Hills in Banner, Morrill, and Scotts Bluff counties and to a lesser extent in the Pine Ridge in Dawes and Sioux counties.

ECOREGIONS: 25a, 25f

ENVIRONMENTAL DESCRIPTION: This community is found on ridge crests and steep (20-40%) upper and middle slopes of various aspects on escarpments. Soils are poorly developed, shallow loamy sands or silt loams formed in colluvium over siltstone or sandstone. In a few cases soils may be absent.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: mountain mahogany (*Cercocarpus montanus*), skunkbrush sumac (*Rhus aromatica*)

Herbaceous: fringed sage (*Artemisia frigida*), sideoats grama (*Bouteloua curtipendula*), cheatgrass (*BROMUS* spp.), thickspike wheatgrass (*Elymus lanceolatus*)

DIAGNOSTIC SPECIES: *Bouteloua curtipendula*, *Cercocarpus montanus*

VEGETATION DESCRIPTION: This community is dominated by an open canopy of mountain mahogany to 2 m tall. These stands are usually in proximity to coniferous woodland, and scattered Ponderosa pine (*Pinus ponderosa*) and Rocky Mountain juniper (*Juniperus scopulorum*) are sometimes present. Herbaceous cover is sparse to moderate and quite variable. Soils are often loose and highly erodible, and weedy annual grasses (primarily *Bromus japonicus*) and forbs may dominate the understory.

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S3

RANK JUSTIFICATION: This extent of this community in Nebraska is very limited. Most occurrences are naturally disturbed from soil erosion and quite weedy.

GLOBAL RANK: G5

COMMENTS: In Nebraska, this community is associated with western coniferous woodland, and is often present under very open *Pinus ponderosa* canopy.

EXEMPLARY SITES: Wildcat Hills State Recreation Area and Cedar Canyon Wildlife Management Area in Scotts Bluff County.

REFERENCES:

The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey vegetation mapping program: 59pp.

BUCKBRUSH SHRUBLAND

ELEMENT CODE: CEG001131

GLOBAL NAME: *Symphoricarpos occidentalis* Shrubland

OTHER NAMES: Wolfberry shrubland

RANGE: This community occurs in the western half of the State and may be scattered eastward.

ECOREGIONS: 25, 27, 42, 43

ENVIRONMENTAL DESCRIPTION: This community is found in mesic swales, depressions, ravine bottoms and in floodplains. Soils are deep, moderately well to somewhat poorly drained silt loams and sandy loams formed in colluvium or alluvium and are occasionally flooded briefly after heavy rains.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: skunkbrush sumac (*Rhus aromatica*), buffalo currant (*Ribes aureum*), wolfberry (*Symphoricarpos occidentalis*)

Short shrub: western poison ivy (*Toxicodendron rydbergii*)

Vine: woodbine (*Parthenocissus vitacea*)

Herbaceous: sideoats grama (*Bouteloua curtipendula*), cheatgrass (*BROMUS* spp.), western wheatgrass (*Elymus smithii*), catnip (*NEPETA CATARIA*), Kentucky bluegrass (*POA PRATENSIS*), Pennsylvania pellitory (*Parietaria pennsylvanica*), little bluestem (*Schizachyrium scoparium*)

DIAGNOSTIC SPECIES: *Rhus aromatica*, *Symphoricarpos occidentalis*

VEGETATION DESCRIPTION: This community is usually densely vegetated by shrubs mostly under 1 m tall. Shrub cover is usually >50% and may often approach 100%. Wolfberry is the most abundant species. Chokecherry (*Prunus virginiana*), buffalo currant, and skunkbrush sumac are often scattered among the wolfberry, forming a sparse 1-2 m tall overstory. A short shrub understory of western poison ivy is often present and is sometimes the dominant ground cover. Woody and herbaceous vines are sometimes present, including western virgin's bower (*Clematis ligusticifolia*) and woodbine. The herbaceous layer is poorly developed in most sites and often consists of weedy exotics (cheatgrass, catnip, Kentucky bluegrass) and a few native annuals such as Pennsylvania pellitory. In more open sites, native grasses fill the spaces between shrubs, the most common species being sideoats grama, prairie sandreed (*Calamovilfa longifolia*), western wheatgrass and little bluestem. Species diversity is relatively low.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S4

RANK JUSTIFICATION: This community is fairly common through its range. Most sites are weedy due to grazing or deposition of sand or silt following heavy rains.

GLOBAL RANK: G4G5

COMMENTS: Patches of buckbrush may occur on uplands associated with woodlands in eastern Nebraska and may be similar to this community type, but have different associated species. It is doubtful that the majority of Nebraska's buckbrush patches deserve recognition as a separate community, though extensive stands in ravine bottoms are probably noteworthy.

EXEMPLARY SITES: The best-studied examples are at Scotts Bluff National Monument in Scotts Bluff County.

REFERENCES:

The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey vegetation mapping program: 59pp.

SUMAC-DOGWOOD SHRUBLAND

ELEMENT CODE: C EGL005219

GLOBAL NAME: *Cornus drummondii* – (*Rhus glabra*, *Prunus* spp.) Shrubland

OTHER NAMES: *Rhus glabra-Corylus americana* associates (Aikman, 1929); Shrub association (Costello, 1931).

RANGE: This community is present mostly in the eastern half of the State and scattered in appropriate habitats westward.

ECOREGIONS: 27, 42, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on level to moderate slopes of uplands, usually along the borders of upland woods, though also in ravines in grasslands and on floodplain terraces. Soils are silty loams or silty clay loams formed in loess and glacial till, and are usually well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: roughleaf dogwood (*Cornus drummondii*), wild plum (*Prunus americana*), smooth sumac (*Rhus glabra*), wolfberry (*Symphoricarpos occidentalis*), coralberry (*S. orbiculatus*).

Herbaceous: Kentucky bluegrass (*POA PRATENSIS*)

DIAGNOSTIC SPECIES: *Corylus americana*, *Prunus americana*, *Rhus glabra*

VEGETATION DESCRIPTION: This community consists of bands or patches of shrubs 2–3 m tall, with smooth sumac usually the dominant species, though in some places American hazel (*Corylus americana*), roughleaf dogwood or wild plum may dominate, particularly in more mesic or shaded situations. Vines, including bittersweet (*Celastrus scandens*) and woodbine (*Parthenocissus vitacea*), may be present in dense stands of shrubs. In these dense thickets, herbaceous cover is sparse to moderate and often consists predominately of shade-tolerant exotics such as Kentucky bluegrass and catnip (*Nepeta cataria*). In open stands, herbaceous understory is denser and consists of species typical of the surrounding grassland habitats. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Shining sumac (*Rhus copallina*) is uncommon in Nebraska, and may be part of this community in the extreme southeastern part of the State.

STATE RANK: S5

RANK JUSTIFICATION: This community has become widespread since European settlement due to fire suppression.

GLOBAL RANK: GM

COMMENTS: The species composition of this community is highly variable and several subtypes may need to be recognized after further field studies. Aikman (1929) mentioned a *Shepherdia argentea-Prunus virginiana* association that replaces this community in northern Nebraska, but did not provide any detail. Katak (1995) reported an upland thicket community occurring in the ecotone between pine woodland and Sandhills prairie along the Niobrara River, which may be synonymous with sumac-dogwood shrubland.

Many land managers consider the presence of this community undesirable, as it often invades upland prairie from which fire has been eliminated for some time. It often borders woodlands, but may be found away from woodlands as well. In many places stands are extensive, though in regularly burned grasslands they may be restricted to lowland ravines and draws.

EXEMPLARY SITES:

REFERENCES:

Aikman, J. M. 1929. Distribution and structure of the forests of eastern Nebraska. Botanical Seminar, University of Nebraska Botanical Survey, New Series 5:1–75.

Costello, D. F. 1931. Comparative study of river bluff succession on the Iowa and Nebraska sides of the Missouri River. *Botanical Gazette* 91:295–307.

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara River valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

WETLAND HERBACEOUS COMMUNITIES

MARSH SEEP

ELEMENT CODE: CEGLO0000K

GLOBAL NAME: None presently designated.

OTHER NAMES:

RANGE: This community is most common in valleys of large rivers and streams and is known to occur along the Calamus, Elkhorn, Missouri, Little Blue, Loup, Niobrara and Platte Rivers. It is likely to occur throughout the state with the exception of the Panhandle and extreme southwest, and appears to be most common north of the Platte River.

ECOREGIONS: 27e, 27f, 27g?, 42?, 43r, 44a, 44c, 44d, 47

ENVIRONMENTAL DESCRIPTION: This community occurs along the margins of rivers and natural lakes with high groundwater levels, or in seeps and in basins below areas of permanent groundwater discharge. Soils are organic and may consist of a peat or muck layer about 10-35 cm thick overlying sand or gravel derived from eolian sand or alluvium. Groundwater of near neutral to slightly acidic pH continually saturates at least part of the community.

COWARDIN WETLAND SYSTEM: Palustrine emergent, saturated

MOST ABUNDANT SPECIES:

Tall shrub layer: false indigobush (*Amorpha fruticosa*)

Herbaceous: Emory's sedge (*Carex emoryi*), riggut sedge (*C. lacustris*), Nebraska sedge (*C. nebrascensis*), sawbeak sedge (*C. stipata*), bald spikerush (*Eleocharis erythropoda*), orange jewelweed (*Impatiens capensis*), rice cutgrass (*Leersia oryzoides*), northern clearweed (*Pilea fontana*), common arrowhead (*Sagittaria latifolia*), broadleaf cattail (*Typha latifolia*)

DIAGNOSTIC SPECIES: *Amorpha fruticosa*, *Epilobium leptophyllum*, *Galium tinctorium*, *Impatiens capensis*, *Pilea fontana*, *Sagittaria latifolia*

VEGETATION DESCRIPTION: The vegetation of this community is patchy and quite variable, but usually contains a conspicuous shrub element. In many places, patches of false indigobush are common to abundant, especially on slightly higher ground within or along the periphery of the site, sometimes with small to extensive patches of sandbar willow (*Salix exigua*) additionally present. Trees are often present, most commonly small green ash (*Fraxinus pennsylvanica*) and scattered peachleaf willow (*Salix amygdaloides*). At some sites scattered diamond willow (*Salix eriocephala*) or small American elm (*Ulmus americana*) are additionally present. A short shrub layer is usually lacking, except for scattered American black currant (*Ribes americanum*) in some sites.

The herbaceous layer varies depending on soil texture. Soft, mucky soils within the community are usually dominated by cattails, bulrushes and rice cutgrass, with patches of orange jewelweed sometimes common in places. Areas with firmer soils tend to be dominated by sedges, usually riggut sedge or Emory's sedge in the eastern part of the state, or Nebraska sedge in the west. Common arrowhead and bald spikerush are also usually abundant through much of the community, along with scattered forbs typical of peat soils as such as marsh bedstraw (*Galium tinctorium*) and fen willowherb (*Epilobium leptophyllum*). Small plants of northern clearweed usually blanket the soil surface among the taller plants.

Along rivers in the Sandhills and eastward in the Elkhorn and Loup system, extensive marsh seep communities are sometimes found that share many species in common with Sandhills fens. Most have a conspicuous layer of sensitive fern (*Onoclea sensibilis*) and marsh fern (*Thelypteris palustris*), and may include bulbous water-hemlock (*Cicuta bulbifera*), lesser tussock sedge (*Carex diandra*), fen panicked sedge (*Carex prairea*), bog spikerush (*Eleocharis elliptica*), scrambling marsh bedstraw (*Galium trifidum*), swamp lousewort (*Pedicularis lanceolata*), and great water dock (*Rumex orbiculatus*). Species considered indicators of Sandhills fens are generally not present, except at some sites within the Sandhills that appear to contain small fen inclusions. Other sites along the Elkhorn River east of the Sandhills have marsh marigold (*Caltha palustris*) and are similar to some eastern Sandhills fens in species composition. Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Uncommon species found in this community include *Caltha palustris*, *Carex diandra*, *C. prairea*, *C. utriculata*, *Cicuta bulbifera*, *Liparis loeselii*, *Ophioglossum pusillum*, and *Pedicularis lanceolata*.

STATE RANK: S?

RANK JUSTIFICATION: The full range of this habitat has yet to be determined. Most sites outside the Sandhills are small in size and some are degraded.

GLOBAL RANK: G?

COMMENTS: This community as here defined is a catch-all for saturated wetlands with primarily organic soils that are not fens, and includes portions of the seep zone of the Seep/Stream community of the 2000 classification. Most sites either lack a well-developed peat layer or contain peat less than 30 cm deep, though a few in northeast Nebraska may have a slightly thicker peat layer but lack fen indicator species. Though there is a great deal of

variation in species composition through the state, the dominant species are fairly consistent, especially outside the Sandhills.

The distinction between marsh seep and fen is not always well established, and large portions of many Sandhills fens are not distinguishable from this community. In addition, this community may extensively intergrade with Sandhills wet meadow and probably also freshwater marsh communities. Most previous records of this community have been classified as fen, wet meadow, freshwater marsh or seep. Certain large marsh seeps in the Sandhills may actually represent degraded fens, and frequently contain marsh marigold and/or Fraser's marsh St. John's-wort (*Triadenum fraseri*). Similarly, some semi-permanently flooded marshes in the Sandhills may have a species composition similar to the wetter phases of this community. The overall variation in vegetation of saturated wetlands in the Sandhills needs further study.

EXEMPLARY SITES: Dead Timber State Recreation Area in Dodge County.

REFERENCES:

SPRING SEEP

ELEMENT CODE: CEGLO02033

GLOBAL NAME: *Typha latifolia* - *Equisetum hyemale* - *Carex (hystericina, pellita)* Seep
Herbaceous Vegetation

OTHER NAMES: Streamside marsh association (Pool, 1914), Great Plains Neutral Seep.

RANGE: This community occurs throughout the State but appears to be best developed in the Sandhills and Pine Ridge regions.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on slopes of hills, in valleys, and at bases of bluffs and occasionally on faces of bluffs associated with streams. Seeps form when rainwater or snowmelt permeates loess, sand, glacial till, limestone or sandstone and contacts an impervious layer of shale, clay or siltstone (though artesian springs may also be present in some places). Soils consist usually of sand with organic matter and are formed in sand or gravel derived from glacial till, eolian sand, bedrock or colluvium. They may be shallow or deep depending on the degree of slope and the parent material. Groundwater of near neutral pH continually saturates at least part of the community. The zone of cold water rivulets flowing from the seeps is included as part of this community type.

COWARDIN WETLAND SYSTEM: Palustrine emergent, saturated

MOST ABUNDANT SPECIES:

Herbaceous: sedges (*Carex* spp.), willow herb (*Epilobium* spp.), common scouringrush (*Equisetum hyemale*), fowl mannagrass (*Glyceria striata*), watercress (*NASTURTIUM OFFICINALE*), bulrushes (*Schoenoplectus* spp.), cattails (*Typha* spp.)

DIAGNOSTIC SPECIES: *Berula erecta*, *Carex hystericina*, *Glyceria striata*, *Equisetum hyemale*, *Marchantia polymorpha* (a liverwort), *Mimulus glabratus*

VEGETATION DESCRIPTION: The vegetation of this community varies greatly with hydrology, substrate, and exposure to sunlight. Species diversity is low to moderate. Two zones are recognized:

- 1) seep zone - This zone occurs at the source of a spring, and its floristic composition varies with degree of saturation. In some open areas which are slightly flooded, small patches of hydrophytic macrophytes 1–2 m tall predominate, most commonly the bulrushes (*Schoenoplectus acutus*, *S. pungens*, and *S. tabernaemontani*), large-fruit bur-reed (*Sparganium eurycarpum*), and broadleaf cattail (*Typha latifolia*). In springs in which the ground remains saturated but not flooded, sedges and mesophytic grasses are often common, including bottlebrush sedge (*Carex hystericina*) and fowl mannagrass. Scattered shrubs such as willows (mostly *Salix exigua* or *S. eriocephala*) or red osier dogwood (*Cornus sericea*) are sometimes present. Many sites contain very few vascular plant species but may have abundant liverworts, especially *Marchantia polymorpha* and mosses. Shaded sites in woodlands are often dominated by field horsetail (*Equisetum arvense*) or common scouringrush, which may form dense stands.
- 2) Spring stream - this zone is the cold water rivulet flowing from the seep zone, and is dominated by partly emergent hydrophytic forbs usually restricted to cold, clear flowing water. Non-flowering submerged plants may be rooted in the streambed, most frequently common waterweed (*Elodea canadensis*), leafy pondweed (*Potamogeton foliosus*), longbeak water-crow'sfoot (*Ranunculus longirostris*), and horned pondweed (*Zannichellia palustris*). These are rarely abundant and with the exception of horned pondweed are rarely found in flower. The margins of the stream bed are frequently dominated by native and exotic hydrophytic forbs which are rooted in or along the stream banks and which form a partly-submergent "mat" along the waters surface. Common species include water parsnip (*Berula erecta*), roundleaf monkey-flower (*Mimulus glabratus*), watercress, and brook speedwell (*Veronica americana*). Brookgrass (*Catabrosa aquatica*), and the water speedwells (*Veronica anagallis-aquatica* and *V. catenata*) may be emergent in shallow water of slow-moving streams. Though often associated with the sources of spring streams, these species may be found well downstream of seeps in streams in the Sandhills (and sometimes drainage ditches) and in the Pine Ridge. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species found in this community include Pennsylvania bittercress (*Cardamine pensylvanica*), spinulose wood fern (*Dryopteris carthusiana*), showy monkey-flower (*Mimulus guttatus*), and northern green orchid (*Platanthera aquilonis*).

STATE RANK: S3S4

RANK JUSTIFICATION: This habitat is still abundant in the Sandhills and in forested ravines in the east and west portions of the State. Some sites are degraded by heavy grazing.

GLOBAL RANK: G3

COMMENTS: The seep zone as described in the 2000 classification included in large part what has now been separated as the Marsh Seep community. Vegetation typical of that community may occur as a mosaic with the seep zone at certain sites, such as at Buckhorn Springs in Cherry County. The primary distinction between the Marsh Seep and the Spring Seep is that the soils of the Marsh Seep community are primarily organic and those of the seep community are mineral. The *Equisetum* dominated spring seeps of woodlands may be distinguishable as a separate subtype or community, but more study is needed. Common scouringrush is rarely found in prairie seeps, and many of the species associated with coldwater rivulets are absent from most woodland seeps.

EXEMPLARY SITES: Many sites are present along streams in the Sandhills and in the Pine Ridge.

REFERENCES:

Pool, R. J. 1914. A study of the vegetation of the sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–312.

Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:91–113.

Steinauer, G. S., and S. B. Rolfsmeier. 1995. Rare plant survey of selected areas of the McKelvie National Forest. Report to the U. S. Forest Service: 27pp.

Tolstead, W. L. 1942. Vegetation of the north part of Cherry County, Nebraska. *Ecological Monographs* 12:255–292

PRAIRIE FEN

ELEMENT CODE: CEGL002041

GLOBAL NAME: *Carex pellita* - *Carex* spp. – *Schoenoplectus tabernaemontani* Plains Fen
Herbaceous Vegetation

OTHER NAMES: Central Tallgrass fen

RANGE: This community is known only from the slopes and bottom of a canyon north of the Little Blue River in Jefferson County.

ECOREGIONS: 27a, 47?

ENVIRONMENTAL DESCRIPTION: This community occurs on mid to lower slopes of hillsides and terraces in ravines or canyons. Soils are deep and consist of peat or muck, sometimes intermixed with sand, overlying an impervious clay layer. Peat layers range in depth from *ca.* 0.3 - 1.5 m and are constantly saturated by groundwater of pH 6.0 - 7.5. Most sites are <1 acre in size.

COWARDIN WETLAND SYSTEM: Palustrine emergent, saturated

MOST ABUNDANT SPECIES:

Herbaceous: sedges (*Carex emoryi*, *C. hystericina*, *C. interior*, *C. pellita*), water hemlock (*Cicuta maculata*), bald spikerush (*Eleocharis erythropoda*), common boneset (*Eupatorium perfoliatum*), orange jewelweed (*Impatiens capensis*), rice cutgrass (*Leersia oryzoides*), marsh fern (*Thelypteris palustris*)

DIAGNOSTIC SPECIES: *Carex hystericina*, *C. interior*, *Dulichium arundinaceum*, *Onoclea sensibilis*, *Thelypteris palustris*

VEGETATION DESCRIPTION: The vegetation is predominately of hydrophytic graminoids <1 m tall, and is usually dominated by several species of sedges and bald spikerush. Marsh fern and sensitive fern (*Onoclea sensibilis*) may be common in undisturbed sites. Scattered shrubs are present, primarily willows (*Salix* spp.). Forbs include many typical of wet meadows and marshes, though some indicator species of peat soils, such as pond-sedge (*Dulichium arundinaceum*) may be present. Species composition of fens is probably related to factors such as depth and composition of organic soils, water chemistry and quality, and level of disturbance. These small sites tend to be remarkably uniform in species composition when compared to Sandhills fens, and vegetation zonation is usually most conspicuous based on position on the slope. Species diversity is moderate.

OTHER NOTEWORTHY SPECIES: Pond-sedge (*Dulichium arundinaceum*) and bushy seedbox (*Ludwigia alternifolia*) are known from the Jefferson County fen.

STATE RANK: S1

RANK JUSTIFICATION: Few sites are known, and are quite small and susceptible to siltation and herbicide drift from adjacent cropland.

GLOBAL RANK: G1

COMMENTS: There are only a few known occurrence of this community in Nebraska, and they probably should be compared with similar and better studied types in the upper Midwest. This

community was formerly defined to include some saturated wetlands associated with seeps and lakes, many of which are now classified as part of the Marsh Seep community. Outside the Sandhills, this community can be defined as a saturated wetland with a pronounced peat layer and a significant fern component. Unlike marsh seeps, prairie fens can occur on slopes, though some small hillside fens have been observed in the northern Sandhills. Nonetheless, many of the floristic distinctions between this community and the Marsh Seep are often unclear, as depth of peat does not always correlate to vegetation. At this time, the Jefferson County site is segregated as a separate community, because of its distinctiveness when compared to other saturated wetlands in eastern Nebraska. Other prairie fens may be present elsewhere in southeast Nebraska.

EXEMPLARY SITES: Steele City Canyon in Jefferson County.

REFERENCES:

SANDHILLS FEN

ELEMENT CODE: C EGL002390

GLOBAL NAME: *Carex interior* – *Eleocharis elliptica* – *Thelypteris palustris* Herbaceous Vegetation

OTHER NAMES:

RANGE: This community occurs in interdunal valleys in the Sandhills primarily in the lakes region of Cherry and a few surrounding counties. Similar fens have also been recently observed in the eastern Sandhills in Garfield and Wheeler counties.

ECOREGIONS: 44a, 44d

ENVIRONMENTAL DESCRIPTION: Sandhills fens are typically found at the headwaters of Sandhills stream valleys or at the upper ends of lakes and marshes, some are as large as 700 acres. Soils are predominately Cutcomb mucky peat consisting primarily of decayed organic matter. Organic deposits range from 0.3 m to >7 m thick and often contain interspersed layers of sand. The oldest deposits have been radiocarbon dated at 12,260 ± 60 yrs B.P. Peat mounds are an important feature of Sandhills fens and are frequently areas of groundwater discharge. The groundwater pH of fens ranges from 6.0 - 6.9.

COWARDIN WETLAND SYSTEM: Palustrine emergent, saturated

MOST ABUNDANT SPECIES:

Shrub: meadow willow (*Salix petiolaris*)

Herbaceous: sedges (*Carex interior*, *C. lacustris*, *C. nebrascensis*, *C. pellita*, *C. prairea*), bog spikerush (*Eleocharis elliptica*), sensitive fern (*Onoclea sensibilis*), common reed (*Phragmites australis*), common arrowhead (*Sagittaria latifolia*), hardstem bulrush (*Schoenoplectus acutus*), marsh fern (*Thelypteris palustris*), broadleaf cattail (*Typha latifolia*)

DIAGNOSTIC SPECIES: *Caltha palustris*, *Carex aquatilis*, *C. interior*, *C. lasiocarpa*, *C. limosa*, *C. prairea*, *Doellingeria umbellata*, *Eriophorum angustifolium*, *E. gracile*, *Menyanthes trifoliata*, *Muhlenbergia glomerata*, *Onoclea sensibilis*, *Ophioglossum pusillum*, *Pedicularis lanceolata*, *Salix petiolaris*, *Symphyotrichum boreale*, *Thelypteris palustris*, *Triadenum fraseri*

VEGETATION DESCRIPTION: The vegetation of this community is patchy, and most fens occur as a mosaic with areas of Marsh Seep, Sandhills Wet Meadow, and Sandhills Freshwater Marsh. The vegetation described here is associated with uplifted peat mounds and quaking sedge mats. Species diversity is relatively high. Two zones are described:

- 1) fern meadow zone - occurs on peat mounds and is dominated by stands of meadow willow 1-2 m tall, or tall herbaceous macrophytes such as common reed, hardstem bulrush, or common cattail. The understory is commonly dominated by sensitive fern, marsh fern, and hydrophytic graminoids, most commonly bog spikerush. This zone may also occur as a mosaic in Sandhills marshes in areas composed primarily of mucky peat. Fen indicator species which may be present in this zone include marsh marigold (*Caltha palustris*), swamp lousewort (*Pedicularis lanceolata*), and marsh St. John's-wort (*Triadenum fraseri*). This zone usually occurs as a mosaic with the following.
- 2) sedge zone - usually consists of a single herbaceous layer dominated by hydrophytic sedges. Most abundant species include *Carex interior* and *C. prairea*. Most fen indicator species are restricted to this zone, including flat-top aster (*Doellingeria umbellata*), cottongrass (*Eriophorum* spp.), bog muhly (*Muhlenbergia glomerata*), northern adder's-tongue (*Ophioglossum pusillum*), and bog aster (*Symphyotrichum boreale*). In wetter sites, sedges typical of Sandhills marshes, such as riggut sedge (*Carex lacustris*), and Nebraska sedge (*C. nebrascensis*) may dominate, with fen tussock sedge (*Carex aquatilis*) or rarely woolly-fruit sedge (*C. lasiocarpa*) present in some areas. This zone is mostly confined to areas with fibrous sedge peat, and tends to become more extensive in mowed fens. In some instances, mowing may reduce the shrub and coarse graminoid component and convert areas of the fern meadow zone to the sedge zone.

OTHER NOTEWORTHY SPECIES: Vascular plant species uncommon in Nebraska which have been collected in this community include *Acorus americanus*, *Caltha palustris*, *Cardamine pensylvanica*, *Cicuta bulbifera*, *Doellingeria umbellata*, *Eriophorum angustifolium*, *E. gracile*, *Carex aquatilis*, *C. buxbaumii*, *C. diandra*, *C. lasiocarpa*, *C. limosa*, *C. prairea*, *Dulichium arundinaceum*, *Juncus articulatus*, *Lilium philadelphicum*, *Liparis loeselii*, *Menyanthes trifoliata*, *Muhlenbergia glomerata*, *Ophioglossum pusillum*, *Pedicularis lanceolata*, *Sparganium emersum*, *Symphyotrichum boreale*, *Triadenum fraseri*, and *Zizania palustris*. In addition, the moss species uncommon in Nebraska that have been collected in this community,

include *Aulacomnium palustre*, *Calliergonella cuspidata*, *Campylium stellatum*, *Climacium dendroides*, and *Hypnum pratense*.

STATE RANK: S1S2

RANK JUSTIFICATION: The majority of Sandhills fens have been ditched and seeded to exotic grasses and legumes for use as hay meadows. Decomposition of peat following ditching is be a major concern. Very few high quality fens remain. The few small, protected sites occur in Cherry County, though the largest, most representative sites are all on private property.

GLOBAL RANK: G2

COMMENTS: Ditching and annual midsummer haying promotes the spread of exotic grasses and legumes, especially reed canarygrass (*Phalaris arundinacea*), at the expense of native plants. This community harbors several native plant species far disjunct from their primary ranges to the north and east of the Great Plains. Fens recently seen along Cedar Creek and Beaver Creek in the eastern Sandhills share many species in common with fens farther west, but lack meadow willow, and do not exhibit mounding. False indigobush (*Amorpha fruticosa*) and diamond willow (*Salix eriocephala*) usually comprise the shrub layer at these sites. Some saturated peatlands in Cherry County are dominated by Sandhills marsh species with patches of shrubs, but have no mound development (e.g. the east end of Boardman Creek, the east side of Ballard's Marsh). These may represent degraded fens and do not fit comfortably into either the Sandhills fen or Marsh Seep communities. Recently much smaller fen-like marshes have been found along the Calamus and in other streams in the Sandhills which do not exhibit mounding, but which contain one or several fen indicators. Some of these sites may not be completely distinguishable from the Marsh Seep community.

EXEMPLARY SITES: Well-preserved examples are the Allen Valley Fen, Big Creek Fen, and portions of Boardman Creek Fen all in Cherry County, the Jim Carr Fen in Garfield County, and the Pelster Fen in Wheeler County.

REFERENCES:

Steinauer, G. A. 1992. Sandhills fens. NEBRASKAland 70:16–31.

Steinauer, G. A. 1995. Identification of and conservation strategy for Sandhills fens in Cherry County, Nebraska. Report to the Nebraska Game & Parks Commission: 101pp.

Steinauer, G. A., S. B. Rolfsmeier, and J. Phillips Hardy. 1996. Inventory and floristics of Sandhills fens in Cherry County, Nebraska. Transactions of the Nebraska Academy of Sciences 23:9–21.

PONDWEED AQUATIC WETLAND

ELEMENT CODE: CEG002044

GLOBAL NAME: *Potamogeton* spp. - *Ceratophyllum demersum* Great Plains Herbaceous Vegetation

OTHER NAMES: Stonewort-Naiad Association (Pool, 1914), Aquatic Community (Rolfmeier, 1988), Pondweed Open Water Marsh, Pondweed Deep Marsh, Great Plains Pondweed - Mixed Submerged Aquatic Wetland

RANGE: This community is found in freshwater habitats throughout the State, including the Sandhills.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community occurs in shallow (<0.5 m deep) water in natural and artificial freshwater basins, inlets, backwaters and oxbow ponds which remain flooded in all but the driest years. Soils are usually poorly developed and vary from silty clay to sand, with low to moderate amounts of organic matter.

COWARDIN WETLAND SYSTEM: Palustrine aquatic bed, permanently flooded

MOST ABUNDANT SPECIES:

Submerged: coontail (*Ceratophyllum demersum*), stonewort (*Chara* spp.), southern naiad (*Najas guadalupensis*), leafy pondweed (*Potamogeton foliosus*), small pondweed (*Potamogeton pusillus*), sago pondweed (*Stuckenia pectinata*), horned pondweed (*Zannichellia palustris*)

Floating and floating-leaved: duckweeds (*Lemna* spp.), longleaf pondweed (*Potamogeton nodosus*)

DIAGNOSTIC SPECIES: *Ceratophyllum demersum*, *Najas guadalupensis*, *Potamogeton foliosus*, *Potamogeton nodosus*, *Zannichellia palustris*

VEGETATION DESCRIPTION: This community is sparsely to densely vegetated with submersed rooted and free-floating aquatic macrophytes. Species composition varies depending on substrate, water depth, water chemistry, turbidity, water temperature and other factors. This community frequently occurs in association with the freshwater marsh community in deeper areas where emergents are few, especially in bays and inlets of artificial lakes. Dominant species include leafy, small and sago pondweeds, southern naiad, and horned pondweed. Coontail is the most abundant submerged unrooted species, and in some places greater bladderwort (*Utricularia macrorhiza*) is present. In quiet bays, longleaf pondweed (*Potamogeton nodosus*) is often common with duckweeds. In sites with particularly clear water, various species of stonewort (a green alga) may also be common, with the floating aquatic mosquito fern (*Azolla mexicana*) and the liverworts *Riccia fluitans* and *Ricciocarpus natans*. Species diversity is low.

OTHER NOTEWORTHY SPECIES: White water-lily (*Nymphaea odorata*) is known from an oxbow pond along the Elkhorn River, and has been introduced in other sites. Yellow pond-lily

OTHER NOTEWORTHY SPECIES: White water-lily (*Nymphaea odorata*) is known from an oxbow pond along the Elkhorn River, and has been introduced in other sites. Yellow pond-lily (*Nuphar variegata*) and largeleaf pondweed (*Potamogeton amplifolius*) were known historically in the range of this community, but now appear mostly extirpated.

STATE RANK: S4

RANK JUSTIFICATION: Many natural sites have been degraded by stream channelization, drainage, and siltation. Invasion by exotic aquatic weeds may eventually become a threat.

GLOBAL RANK: G4G5

COMMENTS: This community often occurs as a band in deeper water at the margin of freshwater marshes and usually overlaps considerably with that community. This community and the Sandhills Aquatic Wetland may both occur in Sandhills lakes. The Sandhills Aquatic Wetland differs in that the substrate is usually densely covered with organic matter and the prevailing species are submersed broad-leaved pondweeds. Most of the species in the Pondweed Aquatic Wetland may also occur in Sandhills Aquatic Wetland. *Potamogeton crispus* is an exotic pondweed, which is becoming abundant in some occurrences of this community. Eurasian water milfoil (*Myriophyllum spicatum*) is established in a few lakes and appears to be spreading. Both exotics prefer somewhat sandy substrates.

EXEMPLARY SITES: Many examples of this community may be found in backwater ponds along the Loup, Platte and Elkhorn rivers.

REFERENCES:

Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–311.

Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:91–113.

SANDHILLS AQUATIC WETLAND

ELEMENT CODE: CEGLO0000K

GLOBAL NAME: None presently designated.

OTHER NAMES: Pondweed Association, Water lily Association (Pool, 1914)

RANGE: This community occurs in the freshwater lakes region of the Sandhills primarily from western Arthur, Cherry, and Grant counties eastward to Holt County.

ECOREGIONS: 44a, 44d

ENVIRONMENTAL DESCRIPTION: This community occurs in water *ca.* 0.5-1.5 m deep in near-neutral to slightly alkaline lakes and interdunal ponds in the Sandhills region. Soils consist of shallow to deep layers of unconsolidated organic matter over sand.

COWARDIN WETLAND SYSTEM: Palustrine aquatic bed, permanently flooded.

MOST ABUNDANT SPECIES:

Floating and floating-leaved: duckweeds (*Lemna* spp.), water smartweed (*Polygonum amphibium*), floating-leaf pondweed (*Potamogeton natans*), watermeal (*Wolffia* spp.)

Submerged: coontail (*Ceratophyllum demersum*), star duckweed (*Lemna trisulca*), Siberian water milfoil (*Myriophyllum sibiricum*), slender naiad (*Najas flexilis*), variable pondweed (*Potamogeton gramineus*), Illinois pondweed (*P. illinoensis*), small pondweed (*P. pusillus*), clasping-leaf pondweed (*P. richardsonii*), flat-stem pondweed (*P. zosteriformis*), longbeak water crow's-foot (*Ranunculus longirostris*), sago pondweed (*Stuckenia pectinata*), greater bladderwort (*Utricularia macrorhiza*)

DIAGNOSTIC SPECIES: *Lemna trisulca*, *Myriophyllum sibiricum*, *Najas flexilis*, *Potamogeton gramineus*, *P. illinoensis*, *P. natans*, *P. zosteriformis*

VEGETATION DESCRIPTION: This community is dominated by submerged and floating-leaved, rooted and free-floating aquatic macrophytes and algae. Emergent vegetation is uncommon or absent. Species composition is strongly dependent on water chemistry, turbidity, and temperature. Species diversity is low to moderate. Two intergrading zones can be recognized:

- 1) Pondweed zone - is dominated by submerged, rooted vegetation and occurs in deeper water and in areas where wind and wave action affect vegetation. Floating-leaved plants are uncommon to absent, and emergent plants are absent. The most abundant species of these sites include Siberian water milfoil, sago pondweed, clasping-leaf pondweed and flat-stem pondweed.
- 2) Water-lily zone - is dominated by floating-leaved and submerged aquatic macrophytes, and often occurs in shallow water and in deeper quiet bays. Floating-leaf pondweeds and water smartweed are among the common rooted dominants, with floating species such as duckweeds and watermeal often abundant. Common submerged plants include coontail, slender naiad, and narrow-leaved pondweeds such as small pondweed. In some places yellow pond-lily (*Nuphar variegatum*) may be locally abundant, and watershield (*Brasenia schreberi*) is locally common in some sites in the eastern Sandhills. Scattered emergents are sometimes present. Wild rice (*Zizania palustris*) probably once was common in this community, though populations are scattered and local today. This zone is transitional between Sandhills Aquatic Wetland and Freshwater Marsh.

OTHER NOTEWORTHY SPECIES: Uncommon species occurring in this community in Nebraska include *Brasenia schreberi*, *Hippuris vulgaris*, *Myriophyllum verticillatum*, *Nuphar variegatum*, *Nymphaea odorata*, *Pilularia americana*, *Potamogeton friesii*, *P. praelongus*, *P. strictifolius*, and *Sagittaria graminea*.

STATE RANK: S4?

RANK JUSTIFICATION: This community is still fairly extensive and undisturbed in the Sandhills. A few sites have been drained and converted to hay meadows. Invasion by carp may degrade the aquatic vegetation.

GLOBAL RANK: G?

COMMENTS: This community is not distinguished from the Pondweed Aquatic Wetland community in NatureServe's classification, but differs in the dominance of broad-leaved submersed pondweeds which are uncommon to absent in the latter community. It is more similar to *Potamogeton gramineus* – *Potamogeton natans* Northern Great Lakes Herbaceous Vegetation, and our occurrences may represent outliers of that community. Pre-1900 collections of some of these species are known from southeast Nebraska, and this community or a similar one may have existed historically in southeastern Nebraska, and may still be present in some sites along the Elkhorn River.

EXEMPLARY SITES: Hackberry Lake and others at the Valentine National Wildlife Refuge in Cherry County.

REFERENCES:

McCarragher, D. B. 1977. Nebraska's Sandhills Lakes. Nebraska Game and Parks Commission, Lincoln. 67pp.

Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. Minnesota Botanical Studies 4:189–311.

Tolstead, W. L. 1942. Vegetation of the northern part of Cherry County, Nebraska. Ecological Monographs 12:255–292.

POND MARSH

ELEMENT CODE: CEG002026, CEG002229

GLOBAL NAME: *Schoenoplectus tabernaemontani* - *Typha* spp. - (*Sparganium* spp. - *Juncus* spp.) Herbaceous Vegetation; *Typha* spp. – *Schoenoplectus* spp. – Mixed Herbs Great Plains Herbaceous Vegetation

OTHER NAMES: Rainwater Basin Wetlands, Todd Valley Wetlands, Bulrush – Cattail – Bur-reed Shallow Marsh, Great Plains Cattail – Bulrush Marsh.

RANGE: This community is most abundant in the Rainwater Basin Region of south-central Nebraska from western Seward and Fillmore Counties westward to Phelps County and evidently also in the Todd Valley in Colfax, Dodge, and Saunders County and in the loess flats of Custer County.

ECOREGIONS: 27e?, 27f, 47h?

ENVIRONMENTAL DESCRIPTION: This community occurs in basin-like depressions on level uplands. Soils are primarily silt loams and silty clay loams formed in loess in uplands, and alluvium or loess in terraces, and belong to the Scott, Fillmore, and Massie Series. These soils are somewhat to very poorly drained and frequently underlain by an impervious clay pan.

COWARDIN WETLAND SYSTEM: Palustrine emergent, primarily seasonally to semi-permanently flooded.

MOST ABUNDANT SPECIES:

Herbaceous: river bulrush (*Bolboschoenus fluviatilis*), Plains coreopsis (*Coreopsis tinctoria*), barnyard grass (*Echinochloa* spp.), common spikerush (*Eleocharis palustris*), duckweeds (*Lemna* spp.), reed canarygrass (*PHALARIS ARUNDINACEA*), pink smartweed (*Polygonum bicornis*), swamp smartweed (*P. coccineum*), nodding smartweed (*P. lapathifolium*), slender bulrush (*Schoenoplectus heterochaetus*), large-fruit bur-reed (*Sparganium eurycarpum*), broadleaf cattail (*Typha latifolia*)

DIAGNOSTIC SPECIES: *Eleocharis palustris*, *Marsilea vestita*, *Sagittaria calycina*, *S. graminea*, *Schoenoplectus heterochaetus*

VEGETATION DESCRIPTION: Vegetation zonation is conspicuous within this community, and is related to water depth and duration of flooding. Species diversity is moderate to relatively high. Three major zones are recognized after Gilbert (1989):

- 1) outer marsh – is temporarily to seasonally flooded and is dominated by perennial graminoids and (mostly) annual forbs. Spikerushes, rice cutgrass (*Leersia oryzoides*), and swamp smartweed are the common perennial dominants of this zone, and may range from isolated patches to broad near-monocultures. Annual graminoids and forbs including plains coreopsis, barnyardgrass, sprangletop (*Leptochloa fusca*) and smartweeds (*Polygonum bicornis*, *P. hydropiper*, and *P. lapathifolium*) are often abundant in open areas. Other associated forbs include panicked aster (*Symphotrichum lanceolatum*), beggarticks (*Bidens cernua*, *B. frondosa*), white boltonia (*Boltonia asteroides*), Norwegian cinquefoil (*Potentilla norvegica*) and bog yellowcress (*Rorippa* spp.). In well-preserved basins this zone is often fairly narrow, whereas basins that are drained, formerly plowed, or heavily silted may be nearly

entirely occupied by this zone. Reed canarygrass commonly invades and dominates disturbed sites including areas receiving heavy siltation.

- 2) persistent emergent zone - is seasonally flooded and dominated by emergent hydrophytes 1-2 m tall. In undisturbed basins, slender bulrush and large-fruit bur-reed dominate, but in most sites, cattails (*Typha angustifolia*, *T. latifolia* and hybrids) and river bulrush are dominant. Other hydrophytes typically associated with this zone include common water-plantain (*Alisma subcordatum*), common spikerush, and short-beak arrowhead (*Sagittaria brevirostra*). In silted basins, this zone may occur as scattered patches in the lowest portion of the basin.
- 3) inner marsh – occurs in seasonally to semi-permanently flooded areas at the center of some sites. In seasonally flooded sites, hydrophytic annual forbs under 0.5 m tall are often abundant, principally water hyssop (*Bacopa rotundifolia*), mud-plantains (*Heteranthera limosa*, *H. rotundifolia*), and hooded arrowhead (*Sagittaria calycina*). The perennial grassleaf arrowhead (*Sagittaria graminea*) is often additionally present in some undisturbed sites. Common spikerush and western water clover are perennials frequently associated with these species, particularly along the perimeter of this zone. In semi-permanently flooded areas, hydrophytic perennials such as common water-plantain, shortbeak arrowhead (*Sagittaria brevirostra*), and large-fruit bur-reed may be present in addition to the aforementioned annuals. Submersed and floating vegetation is sometimes present including mosquito fern (*Azolla mexicana*), duckweeds (*Lemna* spp., *Spirodela polyrrhiza*), longleaf pondweed (*Potamogeton nodosus*), greater bladderwort (*Utricularia macrorhiza*), and horned pondweed (*Zannichellia palustris*).

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska occurring in these habitats include *Heteranthera multiflora*, *Isoetes melanopoda*, *Potamogeton diversifolius*, *Sagittaria graminea*, *S. longiloba*, and *S. rigida*.

STATE RANK: S2

RANK JUSTIFICATION: Only 10% of the presettlement rainwater basins remain; most have been drained and converted to cropland, and most of the remaining sites have been degraded by siltation. Hydrology of the remaining sites have been modified through drainage and irrigation return flows. The majority have been plowed and cropped at one time. Few, if any, remain in their original presettlement condition.

GLOBAL RANK: G5

COMMENTS: Most larger sites have undergone siltation and contain outer marsh with a small area of persistent emergent vegetation in the center, with an occasional plant typical of the inner marsh zone. Few sites have a well-developed inner marsh zone. The seasonally flooded zone of the Pond Marsh may be synonymous with the Playa Wetland and Spikerush Vernal Pool communities.

The description of this community is based on study of the Rainwater Basin of south-central Nebraska. In addition to the Todd Valley, similar shallow seasonally-flooded marshes

may be present in former channels of the Missouri River and along other large rivers in the State. Shallow marshes outside the Rainwater Basin need further study, as they are not especially separable from the Freshwater Marsh community.

EXEMPLARY SITES: Verona Waterfowl Production Area in Clay County.

REFERENCES:

Gilbert, M. C. 1989. Ordination and mapping of wetland communities in Nebraska's rainwater basin region. Report to the U. S. Army Corps of Engineers, Omaha District, Nebraska: 48pp. plus appendices.

SANDHILLS FRESHWATER MARSH

ELEMENT CODE: CEGLO02030

GLOBAL NAME: *Schoenoplectus acutus* - *Typha latifolia* - (*Schoenoplectus tabernaemontani*)
Sandhills Herbaceous Vegetation

OTHER NAMES: Bulrush - Reed Grass Association (Pool, 1914), Sandhills Bulrush Marsh

RANGE: This community occurs throughout the Sandhills and probably also in outliers in the Platte and Loup River valleys, but is most common in the lakes region from western Cherry and Grant counties eastward to Holt County.

USFS ECOREGION: 27?, 44a, 44c, 44d

ENVIRONMENTAL DESCRIPTION: This community occurs where the regionally high water table intersects the land surface in interdunal Sandhills valleys, and is commonly associated with Sandhill lakes. It may also occur in smaller depressions as well. Soils are deep, very poorly drained, formed in eolian sand, and often contain much organic matter (peat or muck). Soils are flooded most of the year, and surface water levels fluctuate seasonally with groundwater levels. The water in this community is fresh to slightly alkaline.

COWARDIN WETLAND SYSTEM: Palustrine emergent, seasonally and semi-permanently flooded.

MOST ABUNDANT SPECIES:

Herbaceous: ripgut sedge (*Carex lacustris*), bald spikerush (*Eleocharis erythropoda*), common reed (*Phragmites australis*), swamp smartweed (*Polygonum coccineum*), hardstem bulrush (*Schoenoplectus acutus*), three-square bulrush (*S. pungens*), common arrowhead (*Sagittaria latifolia*), large-fruit bur-reed (*Sparganium eurycarpum*), broadleaf cattail (*Typha latifolia*)

Floating-leaved: duckweeds (*Lemna* spp.), watermeal (*Wolffia* spp.)

Submersed: coontail (*Ceratophyllum demersum*), star duckweed (*Lemna trisulca*), pondweeds (*Potamogeton* spp.), horned pondweed (*Zannichellia palustris*)

DIAGNOSTIC SPECIES: *Phragmites australis*, *Schoenoplectus acutus*, *Sagittaria latifolia*, *Typha latifolia*

VEGETATION DESCRIPTION: The vegetation consists primarily of emergent hydrophytic macrophytes to 2 m tall, usually with a submersed aquatic layer in areas flooded most of the season. Species composition is highly variable in response to hydrologic regime and soils. Species diversity is low, but higher than in Sandhills alkaline wetlands. Two intergrading zones can be recognized:

- 1) Bulrush/cat-tail zone - occurs in areas flooded most of the season and is dominated by aquatic macrophytes ca. 2 m tall, with hardstem bulrush usually dominant, and common cattail increasingly common in areas of deeper water. Scattered patches of reed may be present, but are seldom common. Common arrowhead may be found forming a sparse understory layer, but is often locally dense in openings in the overstory, and in deeper water with cattails at the margin of the permanent water line. Openings among the dominants are frequently occupied by arrowhead, with lesser amounts of bur-reed, swamp smartweed, and riggut sedge. Submersed rooted and free-floating aquatics are often present among the emergents.
- 2) Reed zone - occurs in areas that are seasonally flooded and are dominated by common reed (*Phragmites australis*) stands 2–3 m tall. Patches of reeds may spread extensively during periods when the water table is low. Understory vegetation is usually sparse in the dense stands of reed, and consists of rice cutgrass (*Leersia oryzoides*), smartweeds (*Polygonum* spp.), and beggarticks (*Bidens* spp.). Scattered bulrushes and arrowheads may also be present along with other plants of the bulrush/cattail zone. This zone may be quite extensive in the upper ends of some Sandhills lakes and degraded fens.

OTHER NOTEWORTHY SPECIES: Uncommon species present in this community include *Carex vesicaria*, *Glyceria borealis*, *Sagittaria graminea*, *Scolochloa festucacea*, and *Sparganium emersum*.

STATE RANK: S4

RANK JUSTIFICATION: Many unmodified marshes still remain in the Sandhills, though many have been drained, particularly in the eastern Sandhills. Other Sandhills marshes have been converted to lakes by plugging drainage outlets or increasing inflow through upstream ditching.

GLOBAL RANK: G4

COMMENTS: This community often occurs in close proximity to and often intergrades with the Sandhills Aquatic Wetland, Pondweed Aquatic Wetland, Northern Sedge Wet Meadow, Western

Alkaline Marsh, Marsh Seep, and Sandhills Fen communities. McCarraher (1977) indicates that *Schoenoplectus tabernaemontani* is an uncommon constituent of this community.

In general, this community is somewhat separable by the dominance of hardstem bulrush. The reed zone of this community probably deserves recognition as a separate community with a separate hydrology but more data are needed. Many sites formerly recorded as this community probably represent tall-emergent patches of the Marsh Seep community.

EXEMPLARY SITES: Ballard's Marsh Wildlife Management Area in Cherry County.

REFERENCES:

McCarraher, D. B. 1977. Nebraska's Sandhills Lakes. Nebraska Game and Parks Commission. 67pp.

Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. Minnesota Botanical Studies 4:189–312.

Tolstead, W. L. 1942. Vegetation of the northern part of Cherry County, Nebraska. Ecological Monographs 12:257–292.

WESTERN ALKALINE MARSH

ELEMENT CODE: C EGL002040

GLOBAL NAME: *Schoenoplectus pungens* - *Suaeda calceoliformis* Alkaline Herbaceous Vegetation

OTHER NAMES: Permanent saline wetland, wet saline meadow (Rolfsmeier, 1993b); Sandhills alkaline marsh, Western saline marsh, Western Great Plains alkaline marsh

RANGE: This community is most abundant in the "closed basin" region of the western Sandhills in Garden, Morrill, and Sheridan counties, and is also found in the North Platte River floodplain and in other stream valleys in the Panhandle. It may also be present downstream on the Platte River and in extreme northwest Nebraska.

USFS ECOREGIONS: 25h, 27g?, 43g?, 44b

ENVIRONMENTAL DESCRIPTION: This community occupies depressions on the bottomlands of rivers and streams, and the margins of moderately to strongly alkaline lakes in interdunal basins and valleys with no surface inflow or outflow and poor subsurface drainage. Soils are poorly drained, very strongly alkaline silt loam or sandy loam with a silty clay subsoil formed in siltstone, calcareous alluvium or eolian sand. These sites remain inundated through most of the growing season, though portions may dry up late in the year. Salts commonly accumulate as evaporites on shorelines, vegetation, and at times as a thin film on the water's surface. The most abundant salts are sodium and potassium carbonates, with calcium and

magnesium carbonates common, but not abundant. Alkalinity is >5,000 mg/l in some Sandhill lakes.

COWARDIN WETLAND SYSTEM: Palustrine, emergent, seasonally to semi-permanently flooded

MOST ABUNDANT SPECIES:

Submerged: stonewort (*Chara* spp.), sago pondweed (*Stuckenia pectinata*), beaked ditchgrass (*Ruppia occidentalis*), horned pondweed (*Zannichellia palustris*)

Herbaceous: Nevada bulrush (*Amphiscirpus nevadensis*), saltmarsh bulrush (*Bolboschoenus maritimus*), foxtail barley (*Hordeum jubatum*), Nuttall's alkali grass (*Puccinellia nuttalliana*), three-square bulrush (*Schoenoplectus pungens*).

DIAGNOSTIC SPECIES: *Amphiscirpus nevadensis*, *Schoenoplectus pungens*, *Stuckenia pectinata*

VEGETATION DESCRIPTION: Vegetation is usually fairly sparse and consists of hydrophytic and to a lesser extent mesophytic graminoids <1 m tall. Forbs are uncommon in this community, if present at all. Species diversity is low. Three zones may be present:

- 1) Aquatic zone - occurs in areas of shallow to relatively deep permanent or intermittently exposed brackish water and is dominated by submerged rooted aquatic macrophytes. Stonewort and blue-green algae are the only vegetation present in the most strongly alkaline water, but in most sites sago pondweed is common. Beaked ditchgrass is present in some Sandhills lakes. In moderately alkaline water, horned pondweed may also be present and common.
- 2) Marsh zone - occurs in areas of shallow water in seasonally to semi-permanently flooded areas and is dominated by hydrophytic graminoids <1 m tall. Three-square bulrush is usually the dominant emergent species, though in some sites, Nevada bulrush may be abundant. Scattered clumps of hardstem bulrush (*Schoenoplectus acutus*) are often present in Sandhills alkaline marshes, but are never common. This zone grades into the following.
- 3) Wet meadow zone - occurs in seasonally flooded areas at the periphery of marshes and is dominated by mesophytic graminoids <1 m tall, primarily foxtail barley and alkali grass or the introduced spreading alkali grass (*Puccinellia distans*). The only forb recorded from this zone is the introduced saltmarsh sand-spurry (*Spergularia marina*) at Kiowa Wildlife Management Area (Rolfmeier, 1993b).

OTHER NOTEWORTHY SPECIES: Prickly naiad (*Najas marina*) is found in a shallow, brackish pond at Fleisbach Wildlife Management Areas in Morrill County, its only known Nebraska station.

STATE RANK: S3

RANK JUSTIFICATION: This community is still fairly widespread in the western Sandhills and most sites are not heavily impacted by drainage, grazing, or invasion by exotic species. Some sites in Box Butte County have been eliminated due to lowering of the water table by irrigation. Most of the marshes present in the North Platte River valley were evidently drained many years ago.

GLOBAL RANK: G3G4

COMMENTS: Outside of the Sandhills, the aquatic and marsh zones of this community are often not extensive, and exist mostly as patches in alkaline meadows or intermittent stream bottoms where canal seepage or natural freshwater springs maintain higher than normal water levels. It seems possible that some bison wallows in the North Platte valley may have been sufficiently deep to support marsh and aquatic vegetation, and several small ponds near Fleisbach WMA may represent former wallows.

EXEMPLARY SITES: Smith Lake on the Crescent Lake National Wildlife Refuge in Garden County, Fleisbach Wildlife Management Area in Morrill County, and Kiowa Basin Wildlife Management Area in Scotts Bluff Counties.

REFERENCES:

- Bleed, A., and M. Ginsberg. 1990. Lakes and wetlands. Pp. 115–122 in Bleed, A. and C. Flowerday, eds., *Atlas of the Sand Hills*. Resource Atlas No. 5a. Conservation and Survey Division, University of Nebraska-Lincoln: 265pp.
- Matherne, A. M. 1994. Freshwater and saline floodplain wetlands of the North Platte River - sources and seasonal dynamics: Kiowa Wildlife Management Area, Morrill, NE. Report to the Nebraska Game and Parks Commission: 19pp. plus appendices.
- Rolfsmeier, S. B. 1993a. The saline wetland-meadow vegetation and flora of the North Platte river valley in the Nebraska Panhandle. *Transactions of the Nebraska Academy of Sciences* 20:12–24.
- Rolfsmeier, S. B. 1993b. Analyses of the natural vegetation at Kiowa Basin, Scotts Bluff County, Nebraska. Report to the Nebraska Game and Parks Commission: 12 pp. plus map.
- Tolstead, W. L. 1942. The vegetation of the north part of Cherry County, Nebraska. *Ecological Monographs* 12:255–292.

EASTERN SALINE MARSH

ELEMENT CODE: CEG002043

GLOBAL NAME: *Distichlis spicata* – *Schoenoplectus maritimus* – *Salicornia rubra*
Herbaceous Vegetation

OTHER NAMES: Eastern Great Plains Saline Marsh; *Hordeum jubatum* - *Iva annua* community, *Ruppia-Potamogeton* community, *Scirpus maritimus* community (Ungar *et al.*, 1969)

RANGE: This community is restricted to Lancaster and southern Saunders Counties in southeastern Nebraska, primarily in the valleys of Salt Creek, Little Salt Creek, and Rock Creek.

USFS ECOREGION: 47i

ENVIRONMENTAL DESCRIPTION: This community occupies swales and depressions on floodplains and terraces of streams. Soils are deep, poorly drained silty clay loam formed in alluvium that is slightly to moderately affected by soluble salts. The salts accumulate from saline seeps associated with Dakota sandstone underlying these areas. The water table remains above the surface most of the year, but may drop below the surface in late summer.

COWARDIN WETLAND SYSTEM: Palustrine emergent, seasonally to semi-permanently flooded.

MOST ABUNDANT SPECIES:

Herbaceous: saltmarsh bulrush (*Bolboschoenus maritimus*), foxtail barley (*Hordeum jubatum*), annual marsh-elder (*Iva annua*), bearded sprangletop (*Leptochloa fusca*), dwarf bushy knotweed (*Polygonum prolificum*), prairie cordgrass (*Spartina pectinata*), narrowleaf cattail (*TYPHA ANGUSTIFOLIA*).

DIAGNOSTIC SPECIES: *Bolboschoenus maritimus* ssp. *paludosus*, *Ruppia cirrhosa*

VEGETATION DESCRIPTION: The vegetation of this community consists primarily of emergent macrophytes and mesophytic graminoids tolerant of saline conditions. Species diversity is low. Three zones can be recognized within this community:

- 1) Aquatic zone - occurs in areas, which remain flooded throughout the year, and is dominated by the submerged aquatics spiral ditchgrass (*Ruppia cirrhosa*) and sago pondweed (*Stuckenia pectinata*). No naturally occurring permanent wetlands are known in this community type in Nebraska, though one was reported by Ungar *et al.* (1969). Most occur in artificial ponds.
- 2) Marsh zone - occurs in shallow water, in semi-permanently flooded sites and is dominated by emergent hydrophytes 1-2 m tall including saltmarsh bulrush and dwarfed forms of narrowleaf cattail. In strongly saline sites, saltmarsh bulrush predominates. This zone is often developed along the margin of artificial ponds, but probably also exists below seeps.

- 3) Wet meadow zone - occurs in seasonally wet areas such as margins of marshes and is dominated by mesophytic graminoids and forbs such as foxtail barley, bearded sprangletop, dwarf bushy knotweed, and annual marsh-elder. In less saline areas, prairie cordgrass may be common.

OTHER NOTEWORTHY SPECIES: Saltmarsh aster (*Symphotrichum subulatum*) is known from this community in Lancaster County.

STATE RANK: S1

RANK JUSTIFICATION: This community type has been extensively degraded and destroyed by headcutting of streams, ditching, agricultural conversion and urban development.

GLOBAL RANK: G1G2

COMMENTS: This community is often associated with artificial impoundments, and intergrades with the Eastern Saline Meadow community, and with the Wet-Mesic Tallgrass Prairie and Eastern Sedge Wet Meadow communities to a lesser extent. Some sites may be mosaics of several community types. Freshwater marshes often occur in proximity to the saline marshes.

EXEMPLARY SITES: Little Salt Fork Marsh at the upper end of Little Salt Creek in Lancaster County.

REFERENCES:

- Gersib, R. A., and G. A. Steinauer. 1991. A biological inventory and general assessment of eastern Nebraska saline wetlands in Lancaster and southern Saunders counties. *Transactions of the Nebraska Academy of Sciences*, 18:37-44.
- Gilbert, M. C. and R. G. Stutheit, eds. 1994. Resource categorization of Nebraska's Eastern saline wetlands. Prepared for the Eastern Nebraska Saline Wetlands Interagency Study Project, U. S. Army Corps of Engineers, Omaha District, and Nebraska Game & Parks Commission. 18 pp.
- National Wetlands Inventory. 1995. Rock Creek, Nebraska Wetland Trend Study 1937 to 1987. Unpublished report for the Nebraska Game & Parks Commission. 9 pp.
- Rolfsmeier, S. B. 1991. The flora and plant communities of the Ceresco saline basins, southern Saunders County, Nebraska. Unpublished report to the Lower Platte South Natural Resources District. 24 pp.
- Shirk, C. J. 1924. An ecological study of the vegetation of an inland saline area. Unpublished doctoral dissertation, University of Nebraska-Lincoln. 126 pp.

Ungar, I. A., W. Hogan and M. McClelland. 1969. Plant communities of saline soils at Lincoln, Nebraska. *American Midland Naturalist* 82:564–577.

FRESHWATER MARSH

ELEMENT CODE: CEGL002229 (includes CEGL002233, CEGL002228, CEGL002389)

GLOBAL NAME: *Typha* spp. – *Schoenoplectus acutus* – Mixed Herbs Midwest Herbaceous Vegetation (Also includes *Typha* spp. – *Schoenoplectus* spp. Mixed Herbs Great Plains Herbaceous Vegetation, *Typha* spp. Midwest Herbaceous Vegetation, and *Typha* spp. Great Plains Herbaceous Vegetation)

OTHER NAMES: Lowland freshwater marsh, Midwest Mixed Emergent Deep Marsh, Northern Great Plains Cattail – Bulrush Marsh, Northern Great Plains Cattail Marsh, Midwest Cattail Deep Marsh

RANGE: This community is found in the valleys of permanent streams and rivers throughout the State, and may be associated with artificial impoundments in uplands.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community occupies depressions, swales and old channels on stream floodplains and terraces and may occur as a band along the edge of a stream channel or along the shores of natural and artificial ponds. Soils are very poorly drained and consist of sand, silt, or muck, formed in alluvium. Because of flooding, a high water table or these areas remain inundated through most of the season. Portions may occasionally dry out in mid to late summer to the point where surface water is absent. Nonetheless the water table remains near the surface at all times.

COWARDIN WETLAND SYSTEM: Palustrine emergent, seasonally and semi-permanently flooded

MOST ABUNDANT SPECIES:

Submerged: coontail (*Ceratophyllum demersum*), pondweeds (*Potamogeton* spp.), horned pondweed (*Zannichellia palustris*)

Floating leafed: duckweeds (*Lemna* spp., *Spirodela* spp.)

Herbaceous: common water-plantain (*Alisma subcordatum*), Emory's sedge (*Carex emoryi*), fox sedge (*C. vulpinoidea*), bald spikerush (*Eleocharis erythropoda*), rice cutgrass (*Leersia oryzoides*), common reed (*Phragmites australis*), swamp smartweed (*Polygonum coccineum*), common arrowhead (*Sagittaria latifolia*), bulrushes (*Schoenoplectus acutus*, *S. pungens*, *S. tabernaemontani*), large-fruit bur-reed (*Sparganium eurycarpum*), cattails (*TYPHA ANGUSTIFOLIA*, *T. latifolia*)

DIAGNOSTIC SPECIES: *Sagittaria latifolia*, *Schoenoplectus acutus*, *Schoenoplectus tabernaemontani*, *Sparganium eurycarpum*, *Typha latifolia*

VEGETATION DESCRIPTION: This community is dominated by emergent hydrophytic macrophytes that grow to 2 meters tall. In shallow water, sedges, spikerushes and bulrushes may be abundant, with cattails, bur-reed and arrowhead common in deeper water. Zonation is often quite conspicuous, and the dominants may form dense patches or bands in response to water depth, duration of flooding, siltation and other factors. Submerged plants and duckweeds may often be found among the emergents in deeper water. Trees and shrubs are sometimes present in scattered patches within or at the periphery of this community, most commonly willows (*Salix amygdaloides*, *S. eriocephala*, *S. exigua*), green ash (*Fraxinus pennsylvanica*), and false indigobush (*Amorpha fruticosa*), and a few sites may grade into floodplain woodland. Forbs are uncommon in deeper portions of the marsh (with the exception of arrowheads), but in shallow water, common water-plantain, swamp milkweed (*Asclepias incarnata*), and swamp smartweed may be present. During periods of drought, annuals such as nodding smartweed (*Polygonum lapathifolium*) may dominate. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species present in this community include *Juncus effusus*, *Rumex verticillatus*, *Sagittaria rigida*, and *Zizania palustris*.

STATE RANK: S3S4

RANK JUSTIFICATION: Though still extensive in some parts of the State, this community type has been impacted extensively by alteration of stream channels and flows. Drainage and siltation have also degraded a number of sites. These areas are susceptible to invasion by purple loosestrife (*Lythrum salicaria*) or reed canarygrass (*Phalaris arundinacea*).

GLOBAL RANK: G5

COMMENTS: This community as here defined is a catch-all for all marshes occurring outside the Sandhills and Rainwater Basin and is not very well-differentiated from marshes in those areas as well. Distinctive marsh types are present in the State such as the extensive marshes of common cattail are found in abandoned channels along the channelized portion of the Missouri River. Some of these could be segregated as separate communities but are not recognized at this time since a statewide study of marsh communities is badly needed.

Freshwater marsh intergrades with wet meadow and aquatic wetland communities. Some portions of the Sandhills fen and marsh seep community may be nearly identical to this community, in fact many of the records of this community from the Loup River drainage and elsewhere are better recognized as Marsh Seep. Application of the NatureServe's global names is not clearcut and is tentative at this time.

EXEMPLARY SITES: Beaver Marsh at the Niobrara Valley Preserve in Brown County, Margrave Wildlife Management Area in Richardson County, Wood Duck Wildlife Management Area in Stanton County.

REFERENCES:

- Currier, P. J. 1982. The floodplain vegetation of the Platte River: Phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames: 317pp.
- Weaver, J. E. 1960. Flood plain vegetation of the central Missouri valley and contacts of woodland with prairie. Ecological Monographs 30:37-64.

EASTERN CORDGRASS WET PRAIRIE

ELEMENT CODE: C EGL002224

GLOBAL NAME: *Spartina pectinata* - *Carex spp.* - *Calamagrostis canadensis* - *Lythrum alatum* - (*Oxypolis rigidior*) Herbaceous Vegetation

OTHER NAMES: Central Cordgrass Wet Prairie.

RANGE: This community occurs in river valleys in the tall-grass prairie region of eastern Nebraska, particularly in the southeastern portion of the State.

ECOREGIONS: 27a?, 27f, 47

ENVIRONMENTAL DESCRIPTION: This community is found on nearly level floodplains of rivers and streams, and is often found as strips or bands along stream channels. Soils are deep, well-developed, poorly drained clay loams and silt loams formed in alluvium. These soils often remain waterlogged much of the season, particularly in winter or spring or following heavy rains.

COWARDIN WETLAND SYSTEM: Palustrine, temporarily to seasonally (depressions) flooded.

MOST ABUNDANT SPECIES:

Herbaceous: sedges (*Carex emoryi*, *C. grisea*, *C. pellita*, *C. vulpinoidea*), flat-stem spikerush (*Eleocharis compressa*), Kentucky bluegrass (*POA PRATENSIS*), prairie cordgrass (*Spartina pectinata*).

DIAGNOSTIC SPECIES: *Spartina pectinata*

VEGETATION DESCRIPTION: Vegetative cover is fairly dense and is dominated by hydrophytic and mesophytic graminoids 0.5-1.5 m tall, principally sedges, including *C. brachyglossa*, *C. brevior*, *C. davisii*, *C. emoryi*, *C. grvida*, *C. grisea*, *C. pellita*, and *C. vulpinoidea*. Prairie cordgrass is typically the dominant grass, though in some sites in extreme southeast Nebraska eastern gamma grass (*Tripsacum dactyloides*) may also be abundant. In wetter sites, leafy bulrushes such as *Scirpus atrovirens*, *S. pallidus*, and (in one site) *S. pendulus* are

often present. In drier sites where the community borders wet-mesic tall-grass prairie, big bluestem (*Andropogon gerardii*) may also be common. Forb density is often fairly low, and among the more frequently encountered species are meadow garlic (*Allium canadense* var. *canadense*), Philadelphia fleabane (*Erigeron philadelphicus*), paniced aster (*Symphyotrichum lanceolatum*), common ironweed (*Vernonia fasciculata*) and blue meadow violet (*Viola pratensis*). Existing sites are often mowed and are frequently invaded by cool-season exotics such as Kentucky bluegrass, alsike clover (*Trifolium hybridum*) and red clover (*Trifolium pratense*). Overall species diversity is moderate.

OTHER NOTEWORTHY SPECIES: Yellow-fruit sedge (*Carex brachyglossa*), Spring forget-me-not (*Myosotis verna*), and foxglove penstemon (*Penstemon digitalis*) have been found in this community in Pawnee County.

STATE RANK: S1.

RANK JUSTIFICATION: Very few extensive, high-quality sites remain. Most have been drained and converted to cropland or have been heavily grazed. Exotic species are often abundant in mowed sites, and unmowed sites may succumb to shrub invasion in the absence of fire.

GLOBAL RANK: G3?

COMMENTS: The sites upon which the descriptions are based are in extreme southeast Nebraska, though this community is (or was) likely present in river valleys throughout eastern Nebraska. More work is needed.

EXEMPLARY SITES:

REFERENCES:

EASTERN SALINE MEADOW

ELEMENT CODE: CEGl002031

GLOBAL NAME: *Distichlis spicata* - *Hordeum jubatum* - (*Poa arida* - *Iva annua*) Herbaceous Vegetation

OTHER NAMES: *Distichlis stricta* community, dwarf *Distichlis* community, Prairie-*Distichlis* community, *Salicornia rubra* community, *Suaeda depressa* community (Ungar *et al.*, 1969); Central Tallgrass Saline Meadow; Eastern saline prairie.

RANGE: This community is restricted to Lancaster and Saunders counties in southeastern Nebraska, primarily in the valleys of Salt Creek, Little Salt Creek, and Rock Creek.

ECOREGION: 47i

ENVIRONMENTAL DESCRIPTION: This community occupies shallow depressions and nearly level ground on floodplains and terraces of streams. Soils are deep, poorly drained silty clay loams formed in alluvium that is slightly to moderately affected by soluble salts. The salts accumulate from saline seeps associated with Dakota Sandstone underlying these areas. The water table varies from just above to *ca.* 2 feet below the surface. Soils of this community are drier than those of the Eastern Saline Marsh community, and are more variable in soil salinity (0.2–4.7 % total salts). Shallow depressions in these areas accumulate clay and salts, and are usually flooded early in the growing season. As these depressions dry out, salt crusts form on the surface.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily flooded

MOST ABUNDANT SPECIES:

Herbaceous: inland saltgrass (*Distichlis spicata*), foxtail barley (*Hordeum jubatum*), annual marsh-elder (*Iva annua*), Plains bluegrass (*Poa arida*), saltwort (*Salicornia rubra*), prairie cordgrass (*Spartina pectinata*), seablite (*Suaeda calceoliformis*)

DIAGNOSTIC SPECIES: *Atriplex dioica*, *Distichlis spicata*, *Poa arida*, *Salicornia rubra*, *Sporobolus texanus*, *Suaeda calceoliformis*

VEGETATION DESCRIPTION: The vegetation consists primarily of saline-tolerant graminoids and forbs <1 m tall. Species diversity usually is greater in areas of low salinity. Two intergrading zones can be recognized:

- 1) Saltgrass zone – is moderately to densely vegetated by saline-tolerant graminoids and forbs <1 m tall. Inland saltgrass is often dominant in sites with higher salinity (0.5-2.0%). As salinity decreases, prairie grasses typical of clay soils appear including blue grama (*Bouteloua gracilis*), buffalograss (*Buchloë dactyloides*) and western wheatgrass (*Elymus smithii*). In areas of low salinity (0.1%), typical upland prairie species may be found, particularly in disturbed areas.
- 2) Salt-flat zone - occupies shallow depressions and is often sparsely vegetated to unvegetated. Dominants include inland saltgrass and seablite. Slightly deeper depressions, which remain wet longer, may be solely vegetated by saltwort. Salt crusts often form in this zone.

OTHER NOTEWORTHY SPECIES: Saltwort (*Salicornia rubra*) and Texas dropseed (*Sporobolus texanus*), both disjunct from their main ranges, are restricted to this community type in Nebraska.

STATE RANK: S1

RANK JUSTIFICATION: This community has experienced extensive degradation and loss from overgrazing, urban and agricultural development, and lowered salinity due to streambed downcutting and subsequent invasion by exotic species.

GLOBAL RANK: G2G3

COMMENTS: This community often grades into the Eastern Saline Marsh community, but does not always occur in association with it. As salinity decreases and saltgrass drops out, western wheatgrass becomes more common and this community may grade into Wheatgrass Playa Grassland or a similar community. It may also grade into Wet-Mesic Tall-grass Prairie, Eastern Sedge Wet Meadow and Freshwater Marsh communities.

EXEMPLARY SITES: Arbor Lake Wildlife Management Area in Lancaster County.

REFERENCES:

Rolfsmeier, S. B. 1991. The flora and plant communities of the Ceresco saline basins, southern Saunders County, Nebraska. Report to the Lower Platte South Natural Resources District, Lincoln, Nebraska: 24 pp.

Ungar, I. A., W. Hogan, and M. McClelland. 1969. Plant communities of saline soils at Lincoln, Nebraska. *American Midland Naturalist* 82:564–577.

EASTERN SEDGE WET MEADOW

ELEMENT CODE: CEGl005272

GLOBAL NAME: *Carex* spp. - (*C. pellita*, *C. vulpinoidea*) Herbaceous Vegetation

OTHER NAMES: Central Midwest Sedge Meadow

RANGE: This community is known from the extreme eastern part of the State in the floodplain of the Missouri and lower Big Nemaha Rivers. It is also likely to occur along other rivers in the southern and eastern part of the State.

ECOREGIONS: 47d, 47h

ENVIRONMENTAL DESCRIPTION: This community occurs in nearly-level floodplains, often in bands surrounding marshy channels. Soils are poorly drained silty and clay loams formed in alluvium. The areas are flooded for much of the summer, but may dry out late in the year.

COWARDIN WETLAND SYSTEM: Palustrine emergent, seasonally and semi-permanently flooded.

MOST ABUNDANT SPECIES:

Herbaceous: sedges: (*Carex cristatella*, *C. pellita*, *C. stipata*, *C. vulpinoidea*), dark-green bulrush (*Scirpus atrovirens*), pale bulrush (*S. pallidus*).

DIAGNOSTIC SPECIES: *Carex cristatella*, *C. vulpinoidea*, *Scirpus atrovirens*, *S. pallidus*

VEGETATION DESCRIPTION: Vegetative cover is fairly dense and is often quite patchy. Dominants include graminoids 0.5-1.5 m tall, namely fox sedge (*Carex vulpinoidea*) and other sedges, particularly *C. cristatella*, *C. molesta*, *C. pellita*, *C. stipata*, and *C. tribuloides*. Other frequent graminoids include spikerushes (*Eleocharis* spp.), inland rush (*Juncus interior*), Torrey's rush (*J. torreyi*), and bulrushes. Rice cutgrass (*Leersia oryzoides*) may be common where this community borders a marsh. Forbs are often common and conspicuous, among them are hemp dogbane (*Apocynum cannabinum*), common water-horehound (*Lycopus americanus*), winged loosestrife (*Lythrum alatum*), panicled aster (*Symphotrichum lanceolatum*), and blue vervain (*Verbena hastata*). Overall species diversity is moderate. Reed canarygrass (*Phalaris arundinacea*) may invade this community to the near exclusion of the native species.

OTHER NOTEWORTHY SPECIES: Frank's sedge (*Carex frankii*), eastern star sedge (*Carex radiata*) and foxglove penstemon (*Penstemon digitalis*) are known from this community in Richardson County.

STATE RANK: S1

RANK JUSTIFICATION: Few extensive sites are known. Most have been drained and converted to cropland or were heavily grazed. Reed canarygrass often invades disturbed sites.

GLOBAL RANK: G?

COMMENTS: This community is not currently well-defined, and few well-preserved sites remain. More work is needed. Some sites in floodplains of may contain young trees, and may succeed to Eastern Cottonwood-Willow Woodland.

EXEMPLARY SITES: Fairly extensive areas are preserved at Margrave Wildlife Management Area in Richardson County.

REFERENCES:

NORTHERN SEDGE WET MEADOW

ELEMENT CODE: CEG002028

GLOBAL NAME: *Calamagrostis canadensis* - *Juncus* spp. - *Carex* spp. Sandhills Herbaceous Vegetation

OTHER NAMES: Hydrophytic tall grass area (Frolik & Keim, 1933), Rush-sedge wet meadow, Water hemlock association (Pool, 1914), Hydrophytic grass and sedge zone (Tolstead, 1942); Sandhills Wet Prairie.

RANGE: This community occurs throughout the Sandhills, and the drainages of Sandhills rivers such as the Loup and Elkhorn. It may also be present along the Niobrara and Platte Rivers.

ECOREGIONS: 27e, 27g?, 44a, 44c, 44d, 47l

ENVIRONMENTAL DESCRIPTION: This community occupies nearly level sites along streams and rivers, in wet interdunal valleys and level, poorly-drained sand flats. The community often forms a zone bordering Sandhills lakes, marshes, and fens. Soils are poorly drained sandy loams and sands with high organic content, and are formed in eolian sand and alluvium. The water table is usually within one meter of the surface throughout the growing season, and portions of these sites may be temporarily flooded in late winter and early spring.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily flooded.

MOST ABUNDANT SPECIES:

Herbaceous: redbtop (*AGROSTIS GIGANTEA*), bluejoint (*Calamagrostis canadensis*), sedges (*Carex crawei*, *C. nebrascensis*, *C. pellita*, *C. praegracilis*, *C. scoparia*, *C. tetanica*), flat-stem spikerush (*Eleocharis compressa*), yellow star-grass (*Hypoxis hirsuta*), rushes (*Juncus* spp.), tapered spring panicum (*Panicum acuminatum*), switchgrass (*Panicum virgatum*), reed canarygrass (*PHALARIS ARUNDINACEA*), timothy (*PHLEUM PRATENSE*), Kentucky bluegrass (*POA PRATENSIS*), prairie cordgrass (*Spartina pectinata*), clovers (*TRIFOLIUM* spp.)

DIAGNOSTIC SPECIES: *Carex crawei*, *C. granularis*, *C. pellita*, *C. tetanica*,

VEGETATION DESCRIPTION: This community is densely vegetated, predominately by hydrophytic graminoids <1 m tall with roots constantly in contact with the water table. Sedges and rushes frequently dominate, the most abundant being *Carex crawei*, *C. pellita*, *C. praegracilis*, *C. scoparia*, and *C. tetanica*. Spikerushes (particularly flat-stem spikerush) and rushes (*Juncus arcticus*, *J. nodosus*, and *J. torreyi*) are occasional to abundant. Native grasses are usually conspicuously less common than sedges, with switchgrass and prairie cordgrass (*Spartina pectinata*) usually occurring as scattered patches, though they may be common where this community comes in contact with the Sandhills Wet-Mesic Prairie and Northern Cordgrass Wet Prairie, respectively. Exotic grasses, particularly redbtop, reed canarygrass, timothy, and Kentucky bluegrass may be dominant, especially in frequently hayed sites. Scattered patches of shrubs, including sandbar willow (*Salix exigua*), diamond willow (*S. eriocephala*), and false indigobush (*Amorpha fruticosa*) may be present, often in slightly wetter areas (e. g. adjacent to streams). Forb species are scattered to locally common, with the more prominent including swamp milkweed (*Asclepias incarnata*), common water-hemlock (*Cicuta maculata*), yellow star-grass, field mint (*Mentha arvensis*), northern water-horehound (*Lycopus uniflorus*), winged loosestrife (*Lythrum alatum*), heal-all (*Prunella vulgaris*), and marsh skullcap (*Scutellaria galericulata*). Eurasian clovers (*Trifolium* spp.) have been seeded in many meadows.

OTHER NOTEWORTHY SPECIES: Prairie fringed orchid (*Platanthera praeclara*) is frequently recorded from the periphery of this community in the eastern half of the Sandhills. Other uncommon species present include *Carex bebbii*, *C. buxbaumii*, *Cypripedium candidum*, *Eleocharis wolfii*, *Lilium philadelphicum*, *Liparis loeselii*, *Muhlenbergia filiformis*, *M. richardsonis*, and *Pedicularis lanceolata*.

STATE RANK: S3

RANK JUSTIFICATION: Though extensive areas of this community type remain in the Sandhills, the majority have been ditched and are annually hayed. Most sites have been seeded to exotic cool-season grasses (*Agrostis gigantea*, *Lolium pratense*, *Phalaris arundinacea*, *Phleum pratense*, *Poa pratensis*) and clovers (*Trifolium* spp.) to the near exclusion of many native species. Excessive center pivot irrigation in the eastern Sandhills may lower the water table sufficiently to threaten many sites. Few high-quality meadows remain.

GLOBAL RANK: G3G4

COMMENTS: This community grades into Sandhills Freshwater Marsh and Sandhills Wet-mesic Prairie. Some wetter examples of this community type may be dominated by bluejoint, but such areas are patchy and not extensive.

EXEMPLARY SITES:

REFERENCES:

- Frolik, A. L., and F. D. Keim. 1933. Native vegetation in the prairie hay district of North Central Nebraska. *Ecology* 14:298–305.
- Kaul, R. B. 1990. Plants. Pp. 127–142 in A. Bleed and C. Flowerday, eds., *An Atlas of the Sandhills*. Resource Atlas No. 5a, Conservation and Survey Division, University of Nebraska, Lincoln, Nebraska.
- Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–312.
- Tolstead, W. L. 1942. Vegetation of the north part of Cherry County, Nebraska. *Ecological Monographs* 12:255–292.

NORTHERN CORDGRASS WET PRAIRIE

ELEMENT CODE: C EGL002027

GLOBAL NAME: *Spartina pectinata* - *Calamagrostis stricta* - *Carex* spp. Herbaceous Vegetation

OTHER NAMES: Grazed grasslands (Currier, 1982), Lowland (floodplain) prairie and meadow (Rolfmeier, 1988), streamside wetland (Kantak, 1995); Great Plains cordgrass wet prairie.

RANGE: This community is most extensive in permanent stream and river valleys from the Platte River valley northward in the central part of the State.

ECOREGIONS: 27e, 27f?, 27g, 42?, 44a, 44c?, 44d

ENVIRONMENTAL DESCRIPTION: This community is found in depressions on nearly level floodplains and terraces of rivers and streams, and is often found as strips or bands in old stream channels. Soils are deep, well-developed, poorly drained loams and sandy loams formed in alluvium. The water table is close to the soil surface, and the soil remains waterlogged or even flooded much of the season. Standing water is normally present in winter or spring and following heavy rains.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily to seasonally (in wet depressions) flooded.

MOST ABUNDANT SPECIES:

Herbaceous: northern reedgrass (*Calamagrostis stricta*), Emory's sedge (*Carex emoryi*), woolly sedge (*C. pellita*), bald spikerush (*Eleocharis erythropoda*), Baltic rush (*Juncus arcticus*), Dudley's rush (*J. dudleyi*), switchgrass (*Panicum virgatum*), three-square bulrush (*Schoenoplectus pungens*), prairie cordgrass (*Spartina pectinata*)

DIAGNOSTIC SPECIES: *Calamagrostis stricta*, *Spartina pectinata*

VEGETATION DESCRIPTION: Vegetative cover is fairly dense and may be patchy or homogeneous at a given site. Dominants include hydrophytic graminoids ca. 1 m tall including Emory's sedge and woolly sedge, northern reedgrass and prairie cordgrass. The amount of herbaceous cover made up by grasses and sedges is nearly equal. Shrubs are scattered to patchy, the most common being sandbar willow (*Salix exigua*), diamond willow (*S. eriocephala*), false indigobush (*Amorpha fruticosa*) and red osier (*Cornus sericea*). Forbs are uncommon to locally common, some of the more common species being viscid goldentop (*Euthamia gymnospermoides*), wild licorice (*Glycyrrhiza lepidota*), winged loosestrife (*Lythrum alatum*), common water-horehound (*Lycopus americanus*), field mint (*Mentha arvensis*), mad-dog skullcap (*Scutellaria lateriflora*), common hedge-nettle (*Stachys pilosa*), and common ironweed (*Vernonia fasciculata*). Many degraded sites are dominated by the exotic grasses redtop (*Agrostis gigantea*), reed canarygrass (*Phalaris arundinacea*), or timothy (*Phleum pratense*). Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Brown bog sedge (*Carex buxbaumii*) and bog white violet (*Viola lanceolata*) may occur in this community in the eastern Sandhills.

STATE RANK: S2

RANK JUSTIFICATION: Very few extensive, high-quality sites remain. Most have been drained and converted to cropland, and the remainder are often heavily grazed. Many sites have been seeded to exotic grasses to the near exclusion of native species. Reduced water levels in many streams may impact this community.

GLOBAL RANK: G2G3

COMMENTS: This community grades into Sandhills Wet Meadow, Sandhills Wet-Mesic Prairie, and Freshwater Marsh.

EXEMPLARY SITES: Well-preserved, extensive examples are preserved at the Mormon Island Crane Meadows in Hall County.

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: Phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames, Iowa: 317pp.

Kantak, G. E. 1995. Terrestrial plant communities of the middle Niobrara Valley, Nebraska. *The Southwestern Naturalist* 40:129–138.

Weaver, J. E. 1960. Flood plain vegetation of the central Missouri valley and contacts of woodland with prairie. *Ecological Monographs* 30:37–64.

PERENNIAL SANDBAR

ELEMENT CODE: CEGLO01203

GLOBAL NAME: *Salix exigua* / Mesic Graminoid Shrubland

OTHER NAMES: Perennial mudflat (Currier, 1982), willow meadow (Morrison, 1935) willow sandbar (Steinauer and Rolfsmeier, 1997).

RANGE: This community is found in the channels of streams and braided rivers throughout the State.

ECOREGIONS: 25, 27, 42, 43?, 44, 47

ENVIRONMENTAL DESCRIPTION: This community is found on sandbars, islands, and shorelines of streams and rivers. Soils are poorly developed and composed of sand with lesser amounts of clay, silt, and gravel formed in alluvium. Drainage varies with soil texture and height above the rivers' surface.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily and seasonally flooded.

MOST ABUNDANT SPECIES:

Shrub: false indigobush (*Amorpha fruticosa*) [saplings], cottonwood (*Populus deltoides*) [saplings], willows (*Salix amygdaloides*, *S. eriocephala*, *S. exigua*) [saplings]

Herbaceous: beggar-ticks (*Bidens* spp.), sedges (*Carex emoryi*, in particular), bald spikerush (*Eleocharis erythropoda*), field horsetail (*Equisetum arvense*), rushes (*Juncus* spp.), blue lobelia (*Lobelia siphilitica*), common water-horehound (*Lycopus americanus*), winged loosestrife (*Lythrum alatum*), smartweeds (*Polygonum* spp.), three-square bulrush (*Schoenoplectus pungens*), late goldenrod (*Solidago gigantea*), prairie cordgrass (*Spartina pectinata*), prairie wedgegrass (*Sphenopholis obtusata*), cocklebur (*Xanthium strumarium*)

DIAGNOSTIC SPECIES: *Salix exigua*, *Spartina pectinata*

VEGETATION DESCRIPTION: The vegetation of this herbaceous community is quite variable, and is generally dominated by short shrubs, sapling trees, and grasses *ca.* 1 m tall. Shrubs in this community are young saplings with sandbar willow (*Salix exigua*) usually the common species, and often are co-dominant with tall perennial graminoids such as prairie cordgrass, sedges, horsetails (*Equisetum* spp.) or numerous forbs including goldenrods (*Solidago* spp.) and asters (*Symphyotrichum* spp.). Occasionally introduced grasses such as redtop (*Agrostis gigantea*) or Kentucky bluegrass (*Poa pratensis*) may be abundant. Cover varies from relatively dense to somewhat sparse and shrub and herbaceous strata are intermingled and of equal height, so that this community is not truly a shrubland. In some sites, the woody component may be fairly sparse, but is generally always present. Annuals of sandbars and mudflats are often present, but not dominant, and include tall, coarse annuals such as beggarticks, smartweeds, and cockleburs, which may be nearly as tall as the shrub layer. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3S4

RANK JUSTIFICATION: The overall extent of this community in Nebraska is not well known. Reduced river flows may make the floods necessary to maintain this community infrequent. Purple loosestrife (*Lythrum salicaria*) may invade this community and outcompete the native species.

GLOBAL RANK: G5

COMMENTS: This community is similar to wet meadow and wet prairie communities, but usually with a more pronounced woody component. Many sites represent early successional stages of sandbar willow shrubland, but sandbar willow is not ubiquitous in all sites. Perennial Sandbar Meadow is a heterogeneous community that covers all river channel communities dominated by perennial hydrophytes. Frequent flooding may prevent this community from

undergoing succession in some sites. More study of this community type is needed. Though it has been included in the *Salix exigua* / Mesic Graminoid community, not all sites appear to belong to that community.

EXEMPLARY SITES: Many sites are present along the Loup and Platte Rivers.

REFERENCES:

- Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames, Iowa: 317pp.
- Morrison, J. L. 1935. The development and structure of the vegetation on the sandbars and islands in the lower Platte River. M. A. thesis, University of Nebraska-Lincoln: 72pp.
- Vaubel, J. A. 1975. Vegetation development in relation to age of river stabilization structures along the channelized segment of the Missouri River. M. A. thesis, University of South Dakota, Vermillion: 109pp.

PLAYA WETLAND

ELEMENT CODE: C EGL002039

GLOBAL NAME: *Polygonum* spp. - *Echinochloa* spp. - *Distichlis spicata* Playa Lake Herbaceous Vegetation

OTHER NAMES: Playa marsh, Playa lake wetland

RANGE: This community is found throughout the State, but is most abundant in the south-central and southwestern parts.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community occurs in shallow depressions in nearly level ground. Soils are silty clay loam underlain by a clay pan in loess or other silty to sandy soils. In southwest Nebraska, they most frequently are associated with soils of the Lodgepole and Scott series. These areas are temporarily to seasonally flooded by ponded rain water and surface runoff, and usually dry out by mid to late summer in all but the wettest years.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily and seasonally flooded

MOST ABUNDANT SPECIES:

Herbaceous: water-hyssop (*Bacopa rotundifolia*), plains coreopsis (*Coreopsis tinctoria*), short-point flatsedge (*Cyperus acuminatus*), blunt spikerush (*Eleocharis obtusa*), barnyard grass

(*Echinochloa* spp.), common waterwort (*Elatine rubella*), mud-plantains (*Heteranthera limosa*, *H. rotundifolia*), false pimpernel (*Lindernia dubia*), carpetweed (*Mollugo verticillata*), pink smartweed (*Polygonum bicornis*), nodding smartweed (*P. lapathifolium*), narrowleaf dock (*RUMEX STENOPHYLLUS*), hooded arrowhead (*Sagittaria calycina*)

DIAGNOSTIC SPECIES: *Coreopsis tinctoria*, *Echinochloa muricata*, *Limosella aquatica*, *Plagiobothrys scouleri*

VEGETATION DESCRIPTION: Annual herbaceous graminoids and forbs mostly <1 m tall dominate the exposed mud flats of the playa, and species composition and extent of the community varies from site to site and year to year. In sites which have been dredged to hold water longer (drainage ditches, re-use pits), perennials such as spikerush (*Eleocharis palustris*) and water clover (*Marsilea vestita*) may dominate. The frequent water fluctuation and thick clay pan prevent establishment of most perennial hydrophytes of pond marshes, such as bulrushes (*Schoenoplectus* spp.) and cattails (*Typha* spp.). Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska which are found in this community include *Amaranthus californicus*, *Ammannia auriculata*, *Bergia texana*, *Elatine brachysperma*, *Eleocharis atropurpurea*, *Isoetes melanopoda*, *Rotala ramosior*, *Schoenoplectus saximontanus* and *Suckleya suckleyana*.

STATE RANK: S1

RANK JUSTIFICATION: The vast majority of playas have been plowed and cropped at some time, and those not plowed are often heavily grazed. Dugouts or "reuse pits" have been created in many playas, which has significantly affected hydrology and reduced floristic diversity. No sites in southwest Nebraska have been protected.

GLOBAL RANK: G2G4

COMMENTS: Playas in the clay soils of northwest Nebraska have many species in common with those elsewhere in the State, but also have *Amaranthus californicus*, *Bergia texana*, *Gnaphalium palustre*, *Plantago elongata*, and a few submerged hydrophytes not known from those sites. These are generally associated with artificial impoundments, and may deserve recognition as a separate community type. Temporary wetlands in the Sandhills containing such species as Hall's bulrush (*Schoenoplectus hallii*) are also included here but may have a different species composition and deserve to be separated. These sites may be synonymous with the playas reported by Tolstead (1942) in Cherry County, but he gave little detail of their species composition.

EXEMPLARY SITES:

REFERENCES:

Rolfsmeier, S. B. 1992. A preliminary survey of the vegetation of the playa wetlands of Deuel, Keith, and Perkins counties in southwest Nebraska. Report to the Nebraska Game and Parks Commission: 23 pp.

Rolfsmeier, S. B. 1996. A survey of the vegetation of clay pans and associated communities on the Oglala National Grasslands, Nebraska. Report to the Nebraska Game and Parks Commission: 21pp.

Tolstead, W. L. 1942. Vegetation of the north part of Cherry County, Nebraska. Ecological Monographs 12:255–292.

WESTERN STREAMSIDE WET MEADOW

ELEMENT CODE: C EGL001813

GLOBAL NAME: *Carex nebrascensis* Herbaceous Vegetation

OTHER NAMES: Nebraska sedge wet meadow. Sedge-bulrush meadow (Steinauer & Rolfsmeier, 2000)

RANGE: This community is known from the Nebraska Panhandle and could occur farther eastward in the State.

ECOREGIONS: 25, 43

ENVIRONMENTAL DESCRIPTION: This community occurs along streambanks, usually along the margins of small, flowing streams or streambeds that contain standing water for much of the growing season. Soils are poorly drained clay, silt, and sandy loams formed in alluvium.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily flooded.

MOST ABUNDANT SPECIES:

Herbaceous: redbtop (*AGROSTIS GIGANTEA*), sedges (*Carex hystericina*, *C. nebrascensis*, *C. pellita*), spikerushes (*Eleocharis erythropoda*, *E. palustris*), Baltic rush (*Juncus arcticus*), three-square bulrush (*Schoenoplectus pungens*)

DIAGNOSTIC SPECIES: *Carex pellita*, *Schoenoplectus pungens*

VEGETATION DESCRIPTION: This community is quite variable but is dominated by sedges (most frequently *Carex pellita*, though *C. hystericina* and/or *C. nebrascensis* may be common in places). Redtop frequently invades this community and may be co-dominant with the other species, and occasionally reed canarygrass (*Phalaris arundinacea*) may be abundant. Forb species are present and species composition is quite variable, though field mint (*Mentha*

arvensis), late goldenrod (*Solidago gigantea*) and blue vervain (*Verbena hastata*) are frequently present. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Northern green orchid (*Platanthera aquilonis*) may be present in this community, especially in the Pine Ridge.

STATE RANK: S2

RANK JUSTIFICATION: Though the extent of this community is still poorly-defined, it is frequently highly degraded by cattle grazing.

GLOBAL RANK: G4

COMMENTS: This community may be a complex of several communities and the global name probably represents only one of them. Some similar communities in mildly alkaline soil (such as along Lodgepole Creek) have a significantly different species composition and may represent a different community type, but are tentatively included here. This community type is a catch-all for wet meadow types that do not fit into the wet meadow or wet prairie communities, but some sites could be synonymous with those. This community may intergrade with the Spring Seep community and with the Western Floodplain Meadow community.

EXEMPLARY SITES:

REFERENCES:

Rolfsmeier, S. B. 1998. A vegetation survey of selected riparian areas on the Oglala National Grasslands in Dawes and Sioux Counties, Nebraska. Unpublished report to the Nebraska Natural Heritage Program, Game & Parks Commission, Lincoln: 22pp. plus maps.

SPIKERUSH VERNAL POOL

ELEMENT CODE: CEGL001833

GLOBAL NAME: *Eleocharis palustris* Herbaceous Vegetation

OTHER NAMES: Spikerush wet meadow, Vernal Pool (Steinauer & Rolfsmeier, 2000)

RANGE: This community is recorded from northwestern and north-central Nebraska, but is potentially statewide.

ECOREGIONS: 43, 44, 47?

ENVIRONMENTAL DESCRIPTION: This community occurs in small (<1 - 200 sq. m), relatively deep (0.5 - 1 m), basin-like depressions in shallow intermittent stream beds or in the

vicinity of ponds and marshes. Soils are silty clays or sands formed in alluvium. These sites are flooded early in the season and usually dry out by mid-summer.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily to seasonally flooded.

MOST ABUNDANT SPECIES:

Herbaceous: needle spikerush (*Eleocharis acicularis*), common spikerush (*Eleocharis palustris*)

Submerged: water starwort (*Callitriche palustris*), water clover (*Marsilea vestita*), water-thread pondweed (*Potamogeton diversifolius*)

DIAGNOSTIC SPECIES: *Callitriche palustris*, *Eleocharis acicularis*, *E. palustris*, *Potamogeton diversifolius*

VEGETATION DESCRIPTION: This community forms in basins that are deep enough to remain flooded through most of the spring and generally dry out by mid-summer. They contain a short (<1 m tall) layer of permanent hydrophytic vegetation, generally made up mostly or wholly of spikerushes, with occasional annuals appearing as the basins dry out in the summer, such as nodding beggarticks (*Bidens cernua*), mudwort (*Limosella aquatica*), popcorn-flower (*Plagiobothrys scouleri*), and smartweeds (*Polygonum* spp.). A submersed aquatic layer is found in some communities which contains such species as water starwort and water-thread pondweed, which mature rather quickly and have unusually high fruit set for submersed aquatics. Water clover may also grow submersed in this community. Species diversity is low.

OTHER NOTEWORTHY SPECIES: Water starwort (*Callitriche palustris*) and water-thread pondweed (*Potamogeton diversifolius*) are uncommon in Nebraska, likely because of the limited distribution of this community.

STATE RANK: S1

RANK JUSTIFICATION: This community was very likely quite widespread at one time, but has disappeared due to conversion to cropland. The submersed species of vernal pools also appear to be highly sensitive to water quality, and often are not found in spring-grazed pastures.

GLOBAL RANK: G5

COMMENTS: This community appears to be related to the Playa Wetland community, except that the sites tend to be more bowl-shaped and have little or no zonation. Reuse pits dug into former playas in southwest Nebraska may contain similar dominants, but tend to lack the submersed aquatic elements. Ephemeral spring wetlands without hydrophytic vegetation are known from prairies and woodland in various places, and are often not readily distinguishable from the surrounding communities. The Spikerush Vernal Pool community as defined herein includes the "Spikerush Wet Meadow" and "Vernal Pool" community of Steinauer and Rolfsmeier (2000). In the NatureServe classification, this community is grouped with spikerush dominated zones of larger wetlands and hence the global rank may not reflect the overall status

of this community. There are historical collections of water-thread pondweed in southeast Nebraska, indicating this community or a similar one may have existed in tall-grass prairie as well.

EXEMPLARY SITES: Representative sites are found in Pasture 31E on the Oglala National Grasslands in Sioux County.

REFERENCES:

Rolfsmeier, S. B. 1996. A survey of the vegetation of clay pans and associated communities in the Oglala National Grassland, Nebraska. Report to the Nebraska Game and Parks Commission, Lincoln: 21pp.

WESTERN ALKALINE MEADOW

ELEMENT CODE: CEGl002042

GLOBAL NAME: *Distichlis spicata* - (*Hordeum jubatum*, *Poa arida*, *Sporobolus airoides*)
Herbaceous Vegetation

OTHER NAMES: Ephemeral saline wetland, Lowland saline prairie, Upland saline prairie (Rolfsmeier, 1993b); Alkaline stream bottom (Rolfsmeier, 1996); Western saline-alkaline prairie

RANGE: This community occurs in the North Platte River valley and its smaller tributary valleys, in the closed basin area of the western Sandhills, the Niobrara River valley in Sioux County and other scattered stream valleys in the Panhandle.

ECOREGIONS: 25, 27, 43, 44

ENVIRONMENTAL DESCRIPTION: The community occurs in nearly level ground on bottomlands or rivers or streams or interdunal valley bottoms in the vicinity of Sandhills alkaline wetlands and lakes. Soils are poorly drained, very strongly alkaline silt loams or sands with silty clay subsoil formed in fine-textured alluvium (Minatare-Janise complex) or eolian sands (Wildhorse complex). The water table varies seasonally from one to three feet below the surface. Shallow depressions in these areas are flooded early in the spring. Salt crusts form on the soil surface as it dries. The upper soil layers often have a pH near 9.5 and high ratios of adsorbed sodium (SAR).

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily flooded

MOST ABUNDANT SPECIES:

Herbaceous: clustered field sedge (*Carex praegracilis*), inland saltgrass (*Distichlis spicata*), slender wheatgrass (*Elymus trachycaulus*), foxtail barley (*Hordeum jubatum*), scratchgrass

(*Muhlenbergia asperifolia*), meadow bluegrass (*Poa arida*), alkali sacaton (*Sporobolus airoides*), seablite (*Suaeda calceoliformis*), alkali arrowgrass (*Triglochin maritima*)

DIAGNOSTIC SPECIES: *Amphiscirpus nevadensis*, *Atriplex dioica*, *Cleomella angustifolia*, *Distichlis spicata*, *Dodecatheon pulchellum*, *Plantago eriopoda*, *Spartina gracilis*, *Sporobolus airoides*, *Thelypodium integrifolium*

VEGETATION DESCRIPTION: The vegetation of this community is moderately dense to sparse and is predominately composed of alkaline-tolerant herbaceous graminoids <1 m tall, with forbs present to a lesser extent. Species diversity is relatively low, and decreases with increasing alkalinity. Two zones may be recognized:

- 1) alkaline prairie zone - consists of alkali-tolerant grasses and forbs, and is dominated by inland saltgrass and alkali sacaton, with clustered field sedge, foxtail barley, and meadow bluegrass frequent in more mesic areas. Forbs are scattered, and include spearscale (*Atriplex dioica*), alkali aster (*Symphyotrichum ciliatum*), viscid camphor-daisy (*Rayjacksonia annua*), and thelypody (*Thelypodium integrifolium*). Eurasian halophytes are commonly present in most sites, including Russian orache (*Atriplex heterosperma*), clasping pepperwort (*Lepidium perfoliatum*), and spreading alkali grass (*Puccinellia distans*). These species are usually not highly invasive and not a threat to the native vegetation.
- 2) salt flat zone - is often sparsely vegetated to unvegetated and usually dominated by inland saltgrass and seablite, with stunted plants of arrowgrass common in some of the wetter depressions. Nevada bulrush (*Amphiscirpus nevadensis*) is locally common in some sites. Salt crusts are often present in this zone.

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska that occur in this community include *Amphiscirpus nevadensis*, *Cleomella angustifolia*, *Glaux maritima*, and *Heliotropium curassavicum*.

STATE RANK: S3

RANK JUSTIFICATION: Relatively few well-preserved sites remain in the North Platte River valley, a great many have been drained and seeded to exotics such as tall wheatgrass (*Elymus elongatus*) and strawberry clover (*Trifolium fragiferum*). In many sites, tall wheatgrass dominates, and nearly excludes some native species. The extent of this community in the Sandhills has not been determined.

GLOBAL RANK: G3

COMMENTS: The Western Alkaline Meadow communities occurring on Wildhorse soils in the Sandhills may eventually warrant recognition as a separate community type, but are too poorly studied at this time to do so. Species composition of the Platte Valley alkaline meadows is very similar to those in the Sandhills, except that alkali sacaton is present in the former, and evidently absent in the latter. Riparian alkaline wetland communities observed on the Oglala National

Grasslands and formerly designated as alkaline intermittent stream bottom community (Steinauer & Rolfsmeier, 1997) are probably best assigned here and to the alkaline phase of the Western Floodplain Terrace Meadow community. This community is commonly grazed or hayed; hayed sites are generally in better condition. This community intergrades with the Western Floodplain Terrace Meadow, and various wet meadow and marsh communities.

EXEMPLARY SITES: Fliesbach Wildlife Management Area in Morrill County and Kiowa Basin Wildlife Management Area in Scotts Bluff County.

REFERENCES:

Matherne, A. M. 1994. Freshwater and saline flood plain wetlands of the North Platte River - sources and seasonal dynamics: Kiowa Wildlife Management Area, Morrill, NE. Report to the Nebraska Game and Parks Commission, Lincoln: 19 pp. plus appendices.

Nielsen, E. L. 1953. Revegetation of alkali flood plains adjoining the North Platte River, Garden County, Nebraska. *The American Midland Naturalist* 49:915-919.

Rolfsmeier, S. B. 1993a. The saline wetland-meadow vegetation and flora of the North Platte river valley in the Nebraska Panhandle. *Transactions of the Nebraska Academy of Sciences* 20:12-24.

Rolfsmeier, S. B. 1993b. Analyses of the natural vegetation at Kiowa Basin, Scotts Bluff County, Nebraska. Report to the Nebraska Game and Parks Commission, Lincoln: 12 pp. plus map.

Rolfsmeier, S. B. 1996. A survey of the vegetation of clay pans and associated communities on the Oglala National Grasslands, Nebraska. Report to the Nebraska Game & Parks Commission: 21pp.

Tolstead, W. L. 1942. The vegetation of the north part of Cherry County, Nebraska. *Ecological Monographs* 12:255-292.

WHEATGRASS PLAYA GRASSLAND

ELEMENT CODE: CEGl002038

GLOBAL NAME: *Pascopyrum smithii* - *Buchloë dactyloides* - (*Phyla cuneifolia* - *Oenothera canescens*) Herbaceous Vegetation

OTHER NAMES: Transition zone (Gilbert, 1989), Wheatgrass Playa Lake Grassland, Playa Meadow

RANGE: This community occurs most abundantly in level loess plain areas in the Rainwater Basin regions of south-central and southwest Nebraska, but is also apparently present in extreme

northwest Nebraska, in the loess hills of central Nebraska, and possibly in the Todd Valley wetlands in the eastern part of the State.

ECOREGIONS: 25d, 27e?, 27f, 43?

ENVIRONMENTAL DESCRIPTION: This community occurs in nearly level ground and in very shallow depressions in uplands. Soils are shallow and somewhat poorly drained silty clay loams underlain by a clay pan and are usually formed in loess (Scott series). These areas may be temporarily flooded in winter or early spring, but usually dry out by early summer.

COWARDIN WETLAND SYSTEM: Palustrine emergent, temporarily and intermittently flooded

MOST ABUNDANT SPECIES:

Herbaceous: ticklegrass (*Agrostis hyemalis*), common ragweed (*Ambrosia artemisiifolia*), bur ragweed (*Ambrosia grayi*), buffalograss (*Buchloë dactyloides*), shortbeak sedge (*Carex brevior*), common spikerush (*Eleocharis palustris*), western wheatgrass (*Elymus smithii*), foxtail barley (*Hordeum jubatum*), inland rush (*Juncus interior*), wedgeleaf fog-fruit (*Phyla cuneifolia*), Kentucky bluegrass (*POA PRATENSIS*), ironweed (*Vernonia fasciculata*)

DIAGNOSTIC SPECIES: *Buchloë dactyloides*, *Elymus smithii*, *Phyla cuneifolia*, *Oenothera canescens*, *Vernonia fasciculata*

VEGETATION DESCRIPTION: Perennial herbaceous graminoids under 1 m tall dominate in this community. Forb diversity and density is often very low, and overall species diversity is low to moderate. Two intergrading zones are recognized:

1) wheatgrass prairie zone – occurs in shallow soil, usually 1-3 inches deep, over clay pans and is intermittently flooded. It is dominated by western wheatgrass and occasionally scattered sedges including shortbeak sedge and heavy sedge (*Carex gravida*). The most common perennial forbs include wedgeleaf fog-fruit, common ironweed, and bur ragweed, with fog-fruit sometimes abundant in ungrazed sites. Annual forbs are often scattered through these sites and include annual ragweed, prairie trefoil (*Lotus unifoliolatus*), and Venus'-looking-glass (*Triodanis leptocarpa* and *T. perfoliata*). In grazed sites, buffalograss and foxtail barley are often common, and ironweed tends to increase. Kentucky bluegrass is the most common exotic invader in this community and may often be nearly as abundant as western wheatgrass in idle sites. In south-central Nebraska, this zone frequently borders and intergrades with upland tall-grass and mixed-grass prairie. In southwestern Nebraska, this community may intergrade with Playa Wetland and may contain early-season ephemeral annuals such as Carolina foxtail (*Alopecurus carolinianus*), waterwort (*Elatine rubella*), mudwort (*Limosella aquatica*), mousetail (*Myosurus minimus*), popcorn flower (*Plagiobothrys scouleri*), and water purslane (*Veronica peregrina* var. *xalapensis*).

2) Sedge meadow zone – occurs in soils mostly 3-6 inches deep and is temporarily flooded. It is primarily dominated by shortbeak sedge, but woolly sedge (*Carex pellita*) may be common

in lower places. Other common graminoids include ticklegrass (*Agrostis hyemalis*), bald spikerush (*Eleocharis erythropoda*), western wheatgrass (*Elymus smithii*), and rice cutgrass (*Leersia oryzoides*). Forbs typically found along the margins of the Pond Marsh community are among the most common forbs, including Plains coreopsis (*Coreopsis tinctoria*), western water clover (*Marsilea vestita*), smartweeds (*Polygonum* spp.), docks (*Rumex* spp.), and common ironweed (*Vernonia fasciculata*), along with species in the wheatgrass prairie zone.

STATE RANK: S1

RANK JUSTIFICATION: The vast majority of these sites, which occur in level grassland, have been destroyed through agricultural conversion. The remaining areas are often heavily grazed. Few sites are protected, and most of these were heavily grazed in the past.

GLOBAL RANK: G2G3

COMMENTS: This community is broadly defined here as including all types of intermittently-flooded western wheatgrass dominated grassland areas occurring in upland depressions with an underlying clay pan (including the transition zone of Gilbert [1989]). This primarily includes the Rainwater Basins of south-central Nebraska and the Perkins Table and vicinity in southwest Nebraska. Scattered examples of this community type may be found in shallow depressions in the loess-derived soils of the tall-grass prairie region of eastern Nebraska and in the loess mixed-grass prairies of central Nebraska. Similar communities in the clay soils of extreme northwest Nebraska are included here as well, but may in fact be synonymous with the *Pascopyrum smithii* – *Hordeum jubatum* Herbaceous Vegetation community of NatureServe. The sedge meadow zone described here intergrades with the outer marsh zone of the pond marsh community and may be included here or possibly as a separate community.

EXEMPLARY SITES: Ungrazed examples of this community are preserved at Verona Wildlife Production Area in Clay County, Ritterbush WPA in Franklin County, Bluestem Basin WPA in Kearney County, and Petersen WPA in Gosper County.

REFERENCES:

- Gilbert, M. C. 1989. Ordination and mapping of wetland communities in Nebraska's rainwater basin region. Report to the U. S. Army Corps of Engineers, Omaha District, Nebraska: 48pp. plus appendices.
- Rolfsmeier, S. B. 1992. A preliminary survey of the vegetation of the playa wetlands of Deuel, Keith, and Perkins counties in southwest Nebraska. Report to the Nebraska Game & Parks Commission: 23pp.
- Rolfsmeier, S. B. 1996. A survey of the vegetation of clay pans and associated habitats on the Oglala National Grasslands, Nebraska. Report to the Nebraska Game & Parks Commission: 21pp.

UPLAND HERBACEOUS COMMUNITIES

SANDSAGE PRAIRIE

ELEMENT CODE: CEG0011459

GLOBAL NAME: *Artemisia filifolia* / *Andropogon hallii* Shrubland

OTHER NAMES: Sand-sage Community (Ramaley, 1939)

RANGE: This community occurs in the Panhandle along the western edge of the Sandhills in Box Butte and Morrill Counties and as isolated stands associated with the Wildcat Hills escarpment in Banner and Scotts Bluff counties, and may be present in southwestern Sioux County. It is most extensive in southwestern Nebraska in Chase, Dundy, and Perkins counties.

ECOREGIONS: 25b, 25f, 25g?, 44a

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level ground to rolling and choppy dunes. Soils are well-drained fine sands and loamy sands formed in eolian sand.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: sandsage (*Artemisia filifolia*)

Herbaceous: sand bluestem (*Andropogon hallii*), blue grama (*Bouteloua gracilis*), cheatgrass (*BROMUS* spp.), prairie sandreed (*Calamovilfa longifolia*), sand lovegrass (*Eragrostis trichodes*), needle-and-thread (*Hesperostipa comata*), sand muhly (*Muhlenbergia pungens*), sand dropseed (*Sporobolus cryptandrus*), yucca (*Yucca glauca*)

DIAGNOSTIC SPECIES: *Artemisia filifolia*, *Calamovilfa longifolia*, *Chenopodium cycloides*, *Eragrostis secundiflorus* ssp. *oxylepis*, *Hesperostipa comata*

VEGETATION DESCRIPTION: As defined here, this community is variable in overall species composition, but is generally dominated by a tall grass layer 1-2 m tall intermixed with mid-grasses 0.5–1 m tall. Prairie sandreed and needle-and-thread are among the most frequently encountered dominants, though in places, sand lovegrass (*Eragrostis trichodes*) may be abundant. Blue grama usually dominates the <0.5 m tall short grass underlayer. On wind-blown dune crests, sand muhly and sand bluestem may be common locally, and other perennial grasses such as purple three-awn (*Aristida purpurea*) and squirreltail (*Elymus elymoides*) are sometimes frequent. Common annual grasses include sand dropseed, sixweeks fescue (*Festuca octoflora*) and slender paspalum (*Paspalum setaceum*), though many sites are heavily infested with cheatgrass (mostly *Bromus japonicus*). A sparse to locally dense shrub layer of sandsage ca. 1 m tall is present, but is rarely dense enough to impact the herbaceous understory. Yucca may also be present, especially on steep slopes and dunes. Conspicuous forbs include numerous species

typical of Sandhills Dune Prairie, including sand-lily (*Mentzelia nuda*), desert goosefoot (*Chenopodium pratericola*), Plains sunflower (*Helianthus petiolaris*), bush morning-glory (*Ipomoea leptophylla*), and showy ipomopsis (*Ipomopsis longiflora*). In southwestern Nebraska, southern plains species are important constituents of the flora of this community, and include *Chenopodium cycloides*, *Chloris verticillata*, *Eragrostis secundiflorus* ssp. *oxylepis*, *Mirabilis exaltata*, *M. glabra*, *Palafoxia sphacelata* and *Pomaria jamesii*. Species diversity is relatively low (in Panhandle sites) to relatively high (in southwestern Nebraska).

OTHER NOTEWORTHY SPECIES: Uncommon species known from this community include *Chenopodium cycloides*, *C. subglabrum*, *Dalea cylindriceps*, *Eragrostis secundiflorus* ssp. *oxylepis*, *Linum berlandieri*, *Mirabilis exaltata*, *Mirabilis glabra*, *Pomaria jamesii*, *Ratibida tagetes*, and *Talinum calycinum*.

STATE RANK: S2?

RANK JUSTIFICATION: Many sandsage prairies in southwestern Nebraska have been converted to center pivot irrigated cropland in recent decades. The remaining sites (including most of those in the Panhandle) are often heavily grazed. Some sites have been sprayed with herbicide to control the spread of sandsage.

GLOBAL RANK: G3

COMMENTS: This community is classified as shrubland by NatureServe, but at least in Nebraska sandsage is rarely dense enough to qualify as shrubland (except in some sites in southwestern Nebraska). Sandsage density tends to increase as a result of overgrazing and in the absence of fire. The sites in the North Platte River drainage in the Panhandle appear to be most similar to Sandhills Dune Prairie, but have finer soil texture and lower species diversity. Sites in the Republican River drainage in southwestern Nebraska are generally richer and have an overall species composition more similar to that of sand/gravel prairie in south-central Nebraska. Some sites lack sand bluestem altogether and have little prairie sandreed. Although the sandsage prairies of the Panhandle and southwestern Nebraska extend into Colorado, neither Ramaley (1939) nor Daley (1972) noted any differences between the two. They are included as a single community pending further field studies.

EXEMPLARY SITES: The north side of Enders Reservoir in Chase County.

REFERENCES:

Daley, R. H. 1972. The native sand sage vegetation of eastern Colorado. M. S. thesis, Colorado State University, Fort Collins: 62pp.

Ramaley, F. 1939. Sand-hill vegetation of northeastern Colorado. Ecological Monographs 9:1–51.

The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.

SANDHILLS DUNE PRAIRIE

ELEMENT CODE: C EGL001467

GLOBAL NAME: *Andropogon hallii* - *Calamovilfa longifolia* Herbaceous Vegetation

OTHER NAMES: Choppy sands rangesite, rolling sands rangesite (Burzlaff, 1962); Climax *Stipa-Bouteloua* Community (Frolik & Keim, 1933), Ridge community, Sandhill prairie community (Kantak, 1995); Slope community (Keeler *et al.*, 1977); Bunchgrass Association, *Muhlenbergia* Association, Blowout Association, Spear-grass Association (Pool, 1914); Sandhills prairie

RANGE: This community occurs throughout the Nebraska Sandhills in north central Nebraska, and in scattered outliers to the west, south, and east.

ECOREGIONS: 25g?, 42, 44, 47l, 47k?

ENVIRONMENTAL DESCRIPTION: This community occurs on stabilized rolling to choppy sand dunes. Soils are poorly developed very fine to moderately coarse sands that are rapidly drained, and are formed in eolian sand. Soils are highly permeable and runoff is often negligible.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: leadplant (*Amorpha canescens*), dwarf prairie rose (*Rosa arkansana*), yucca (*Yucca glauca*)

Herbaceous: sand bluestem (*Andropogon hallii*), hairy grama (*Bouteloua hirsuta*), prairie sandreed (*Calamovilfa longifolia*), sun sedge (*Carex heliophila*), Schweinitz flatsedge (*Cyperus schweinitzii*), sand lovegrass (*Eragrostis trichodes*), stiff sunflower (*Helianthus pauciflorus*), needle-and-thread (*Hesperostipa comata*), porcupine grass (*Hesperostipa spartea*), bush morning-glory (*Ipomoea leptophylla*), sand muhly (*Muhlenbergia pungens*), lemon scurfpea (*Psoralidium lanceolatum*), little bluestem (*Schizachyrium scoparium*)

DIAGNOSTIC SPECIES: *Andropogon hallii*, *Bouteloua hirsuta*, *Calamovilfa longifolia*, *Carex heliophila*, *Chenopodium subglabrum*, *Muhlenbergia pungens*, *Penstemon haydenii*, *Redfieldia flexuosa*

VEGETATION DESCRIPTION: Vegetative cover in this community is relatively sparse in comparison with other grasslands, and is dominated by a mixture of tall grasses 1–2 m high, with an underlayer of mid grasses (0.5–1 m tall) and short grasses (<0.5 m tall). Prairie sandreed is the most common tall grass, with hairy grama and sun sedge commonly forming a short-grass understory layer. Other conspicuous grasses include sand bluestem, sand lovegrass, and needle-

and-thread. On steep slopes, little bluestem may become conspicuous, and may increase with grazing pressure. Wind-blown dune crests and slopes of choppy dunes are often dominated by sand muhly and other species typical of blowouts, in addition to short shrubs such as yucca (*Yucca glauca*) and sand cherry (*Prunus pumila* var. *besseyi*). Other shrubs which may be found scattered in this community include leadplant (*Amorpha canescens*), dwarf prairie rose (*Rosa arkansana*), and western poison ivy (*Toxicodendron rydbergii*). In a few places, wild plum (*Prunus americana*) and chokecherry (*Prunus virginiana*) may form dense patches on dunes. Perennial forbs are plentiful, and among the more conspicuous are stiff sunflower, bush morning-glory, Plains gayfeather (*Liatris squarrosa* var. *glabrata*), hairy puccoon (*Lithospermum caroliniense*), brittle prickly pear (*Opuntia fragilis*), narrowleaf beardtongue (*Penstemon angustifolius*), and others. Native annuals are also conspicuous, particularly in areas of active natural and man-made erosion, and include annual wild buckwheat (*Eriogonum annuum*), Geyer's spurge (*Euphorbia geyeri*), Missouri spurge (*E. missurica* var. *intermedia*), pitseed goosefoot (*Chenopodium berlandieri*), desert goosefoot (*C. pratericola*), winged pigweed (*Cycloloma atriplicifolium*), Sandhills fleabane (*Erigeron bellidiastrum*), field snake cotton (*Froelichia floridana*), showy ipomopsis (*Ipomopsis longiflora*), and stiffstem flax (*Linum rigidum*). Exotic species are infrequent in areas not modified by anthropomorphic disturbance. Russian thistle (*Salsola collina* and *S. tragus*) are the most common exotics. Species diversity is low to moderate, though quite high when compared with other inland dune ranges throughout the world. Blowouts are a noteworthy natural disturbance within this community, and consist of crater-like depressions ca. 50 m to several hectare large formed by wind erosion on dune crests. The soil in a blowout is loose and moving due to wind erosion and slippage. Active blowouts are often unvegetated or sparsely vegetated by rhizomatous "sand-binding" grasses and forbs. The initial species invading the loose sand is blowout grass (*Redfieldia flexuosa*), though other species such as lemon scurfpea, sand muhly, sand bluestem, and prairie sandreed may replace it in some locations. Annual species are conspicuously absent from active blowouts because of the inability of seedlings to withstand constant burial and uprooting in the moving sand. Annuals appear as the blowouts begin to stabilize and eventually "heal over" and succeed to Sandhills Dune Prairie.

OTHER NOTEWORTHY SPECIES: Blowout penstemon (*Penstemon haydenii*) is a federally endangered species found in blowouts in the central and western Nebraska Sandhills. Other species uncommon species in this community include smooth goosefoot (*Chenopodium subglabrum*), smooth four-o'clock (*Mirabilis glabra*), rockpink fameflower (*Talinum calycinum*), and Sandhills fameflower (*T. rugospermum*).

STATE RANK: S5

RANK JUSTIFICATION: This community type is extensive, and many sites are in relatively good condition.

GLOBAL RANK: G4G5

COMMENTS: Sandhills Dune Prairie is distinguished from other sandy prairie communities in the state by its overlayer of prairie sandreed and the underlayer of hairy grama and sun sedge. Sand bluestem has commonly been described as the "controlling" species of Sandhills prairie,

but it is seldom dominant except on a local basis. Schacht, et al. (2000) noted that north facing dune slopes in a grazed Sandhills range site in Brown County were dominated by little bluestem and cool-season grasses including needlegrasses (*Hesperostipa* spp.) and Junegrass (*Koeleria macrantha*). It is unknown if these differences occur consistently throughout the Sandhills. Other authors have subdivided this community, based primarily on degree of slope or position on the dune slope. We include the "rolling sands range site" of Burzlaff (1962), and the "slope community" of Keeler et al. (1980) in Sandhills dune prairie. Prairie occurring on low dunes of the eastern Sandhills and dominated by porcupine grass were segregated as "Eastern Sandhills Needlegrass Prairie" (Steinauer & Rolfsmeier, 2000), a term subsequently applied to all communities in the Sandhills dominated by needlegrasses. Examples of these sites on upper dune slopes and crests are not significantly different. Sandhills Dry Valley Prairie and Dry-Mesic Sand Prairie may also be dominated in part by needlegrass.

EXEMPLARY SITES: Ungrazed examples of this community are found at Arapaho Prairie in Arthur County, Crescent Lake National Wildlife Refuge in Garden County, and Valentine National Wildlife Refuge in Cherry County. A well-managed site grazed by bison is present on the Niobrara Valley Preserve in Brown and Cherry counties.

REFERENCES:

- Burzlaff, D. F. 1962. A soil and vegetation inventory and analysis of three Nebraska Sandhills range sites. University of Nebraska College of Agriculture Research Bulletin 206: 33pp.
- Keeler, K. H., A. T. Harrison, and L. S. Vescio. 1980. The flora and Sandhills prairie communities of Arapaho Prairie, Arthur County, Nebraska. *The Prairie Naturalist* 12:65–79.
- Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–312.
- Schacht, W. H., J. D. Volesky, D. Bauer, A. J. Smart, and E. M. Mousel. 2000. Plant community patterns on upland prairie in the eastern Nebraska Sandhills. *Prairie Naturalist* 32:43–48.
- Tolstead, W. L. 1942. Vegetation of the northern part of Cherry County, Nebraska. *Ecological Monographs* 12:257–292.

SANDHILLS DRY VALLEY PRAIRIE

ELEMENT CODE: CEGl001473

GLOBAL NAME: *Calamovilfa longifolia* – *Stipa comata* Herbaceous Vegetation

OTHER NAMES: Hay Meadow Association [in part] (Pool, 1914), True Prairie Zone (Tolstead, 1942), Valley Community (Keeler & Harrison, 1980)

RANGE: This community occurs primarily in the western half of the Sandhills, but appears to extend eastward into northeast Nebraska along the south side of the Niobrara River.

ECOREGIONS: 44a

ENVIRONMENTAL DESCRIPTION: This community occupies broad to narrow, nearly level interdunal valleys and upland stream terraces in the Sandhills. Soils are well-drained fine sands and loamy fine sands formed in eolian sand. These sites are never flooded, and depth to water table is *ca.* 1.5–2 m below the surface.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: western ragweed (*Ambrosia psilostachya*), white sage (*Artemisia ludoviciana*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), sun sedge (*Carex heliophila*), Canada wildrye (*Elymus canadensis*), western wheatgrass (*Elymus smithii*), needle-and-thread (*Hesperostipa comata*), Junegrass (*Koeleria macrantha*), switchgrass (*Panicum virgatum*), prairie coneflower (*Ratibida columnifera*), little bluestem (*Schizachyrium scoparium*), scarlet globe mallow (*Sphaeralcea coccinea*), sand dropseed (*Sporobolus cryptandrus*)

DIAGNOSTIC SPECIES: *Bouteloua gracilis*, *Hesperostipa comata*, *Panicum virgatum*, *Schizachyrium scoparium*

VEGETATION DESCRIPTION: Total cover in this community is relatively high and is dominated by a mixture of tall grasses 1–2 m high including prairie sandreed and switchgrass, mid grasses 0.5–1 m tall such as needle-and-thread, sand dropseed, little bluestem, and western wheatgrass, and an underlayer <0.5 m tall dominated by blue grama and sun sedge. Forbs are common, and include western ragweed, white sage, prairie coneflower, globe mallow, hemp dogbane (*Apocynum cannabinum*), Flodman's thistle (*Cirsium flodmanii*), prairie ragwort (*Senecio plattensis*), scarlet gaura (*Gaura coccinea*), clammy groundcherry (*Physalis heterophylla*) and many others. Shrubs are relatively short (<1 m tall) and scattered, with leadplant (*Amorpha canescens*), Arkansas rose (*Rosa arkansana*), and western wild rose (*Rosa woodsii*) among the more prevalent species. Disturbed sites are fairly susceptible to invasion by weedy native annuals including plains sunflower (*Helianthus petiolaris*), Rocky Mountain beeblossom (*Cleome serrulata*), and Texas croton (*Croton texensis*) in addition to exotic species.

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S4

RANK JUSTIFICATION: This community is widespread in the western Sandhills, but is frequently subject to heavy grazing and subsequent invasion by exotic species.

GLOBAL RANK:

COMMENTS: This community has been grouped with Western Sandy Slope prairie and Pine Ridge Sandy Slope Prairie into the Prairie Sandreed – Needle-and-thread Prairie of NatureServe. Prairie sandreed is much less prevalent in this community than it is on predominately slope communities. Perhaps it is better included with the *Hesperostipa comata* - *Bouteloua gracilis* herbaceous vegetation association. Sand prairies along the northwest periphery of the Sandhills in the Pandhandle are often dominated by needle-and-thread and blue grama, and have contain conspicuous forbs of mixed-grass prairie in the Panhandle, such as purple locoweed (*Oxytropis lambertii*), standing milkvetch (*Astragalus laxmannii* var. *robustior*), Platte lupine (*Lupinus plattensis*), combleaf evening primrose (*Oenothera coronopifolia*), sweet sand verbena (*Abronia fragrans*), and Plains beebalm (*Monarda pectinata*). This community was provisionally called “Western Sandhills Needlegrass Prairie” but is probably best included in Sandhills Dry Valley Prairie until more data are available. This community also appears to be present atop the bluffs on the south side of the Niobrara River as far east as Knox County, and contains porcupine grass (*Hesperostipa spartea*) in addition to needle-and-thread.

Blowouts are occasionally present in this community, and their bottoms are often close to the water table. Some blowouts in the dry valleys of Arapaho Prairie in Arthur County are dominated by patches of willow (*Salix exigua* and *S. eriocephala*), and Pool (1914) reported submersed aquatic plants established in some.

EXEMPLARY SITES: Ungrazed examples of this community are found at Arapaho Prairie in Arthur County and Crescent Lake National Wildlife Refuge in Garden County. Well-managed grazed examples are present at the Niobrara Valley Preserve in Brown County.

REFERENCES:

- Burzlaff, D. F. 1962. A soil and vegetation inventory and analysis of three Nebraska Sandhills range sites. University of Nebraska College of Agriculture Research Bulletin 206: 33pp.
- Keeler, K. H., A. T. Harrison, and L. S. Vescio. 1980. The flora and Sandhills prairie communities of Arapaho Prairie, Arthur County, Nebraska. *The Prairie Naturalist* 12:65–78.
- Pool, R. J. 1914. A study of the vegetation of the Sandhills of Nebraska. *Minnesota Botanical Studies* 4:189–312.
- Tolstead, W. L. 1942. Vegetation of the northern part of Cherry County, Nebraska. *Ecological Monographs* 12:257–292.

DRY-MESIC SAND PRAIRIE

ELEMENT CODE: CEGL00000K

GLOBAL NAME: None presently designated.

OTHER NAMES: Eastern Sandhills needlegrass prairie, in part; Sandhills wet-mesic tall-grass prairie, in part (Steinauer & Rolfsmeier, 2000).

RANGE: This community occurs through the eastern Sandhills west to Logan and eastern Cherry counties. It may also be present in Sandhill outliers associated with the Elkhorn, Loup, Platte River drainages.

ECOREGIONS: 27?, 44a, 44c, 47I?

ENVIRONMENTAL DESCRIPTION: This community occurs mostly on lower dune slopes and on small sandy rises associated with wet meadows. Soils are sandy and often have little organic matter and are formed in eolian sand or alluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: field pussytoes (*Antennaria neglecta*), blue grama (*Bouteloua gracilis*), porcupine grass (*Hesperostipa spartea*), switchgrass (*Panicum virgatum*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*)

DIAGNOSTIC SPECIES: *Fimbristylis puberula* var. *puberula*, *Hesperostipa spartea*, *Panicum linearifolium*, *Schizachyrium scoparium*, *Sorghastrum nutans*

VEGETATION DESCRIPTION: This community is dominated by a variable assemblage of tall and mid grasses, most commonly porcupine grass, little bluestem and Indian grass. In some sites spring panicums (mostly *P. acuminatum* and *P. linearifolium*) or hairy fimbry (*Fimbristylis puberula* var. *puberula*) are also abundant. In moister areas and at the margins of wet meadows, switchgrass and scattered wet meadow species may be common. Species typical of Sandhills Dune Prairie such as prairie sandreed (*Calamovilfa longifolia*) and sun sedge (*Carex heliophila*) may be common on the drier margins. In hayed meadows, a short-grass layer of blue grama is sometimes present. Shrubs are usually uncommon, especially in hayed sites. Leadplant (*Amorpha canescens*) is usually the most common, though in places sand cherry (*Prunus pumila* var. *besseyi*), dwarf prairie rose (*Rosa arkansana*) and prairie willow (*Salix humilis*) are locally common. Forb density and diversity is often very high, and usually no one species is particularly abundant, with the exception of field pussytoes. Other forbs sometimes associated with these sites include western ragweed (*Ambrosia psilostachya*), stiff sunflower (*Helianthus pauciflorus*), frostweed (*Helianthemum bicknellii*), clammy groundcherry (*Physalis heterophylla*) and stiff goldenrod (*Solidago rigida*). Many species typical of the surrounding communities are also present. Species diversity is relatively high in undisturbed sites, and often much lower in sites seeded to or invaded by exotic cool-season grasses. Swales and abandoned stream channels associated with this community have a unique suite of species of uplands and wet meadows and deserve further study.

OTHER NOTEWORTHY SPECIES: Uncommon species in this community include *Allium canadense* var. *fraseri*, *Fimbristylis puberula* var. *puberula*, *Helianthemum bicknellii*, *Lechea tenuifolia*, *Nuttallanthus texanus*, and *Scleria triglomerata*.

STATE RANK: S?

RANK JUSTIFICATION: The full extent of this community is unknown. Many hay meadows associated with this community in the eastern Sandhills were converted to center-pivot irrigated cropland in the early 1980's. Drops in the water table due to overharvesting of water may convert remaining areas to Sandhills Dune Prairie.

GLOBAL RANK: G?

COMMENTS: This community contains part of the Eastern Sandhills Needlegrass Prairie and the Sandhills Wet-mesic Prairie (which has been combined with tall-grass prairie) of the 2000 classification. It is similar to NatureServe's Midwest Dry-Mesic Sand Prairie and appears equivalent to the areas of little bluestem and Indian grass in the Sandhills briefly mentioned by Weaver (1965). This community intergrades with Tall-grass prairie and Sandhills Dune Prairie. It usually occurs in bands between wet meadow or tall-grass prairie and the adjacent prairie uplands, and is most typically found on low (<1 m) ridges of sand in wet meadow complexes. There is no single species that consistently dominates this community, though, little bluestem, switchgrass, porcupine grass or Indian grass always comprise one or more of the dominants.

EXEMPLARY SITES: Examples are scattered at the Dry Creek area on the north side of Calamus Reservoir.

REFERENCES:

Weaver, J. E. 1965. *Vegetation of Nebraska*. Lincoln, University of Nebraska Press, 185pp.

TALLGRASS PRAIRIE

ELEMENT CODE: CEGL002203, CEGL002025 (also includes CEGL001464, CEGL002023, and CEGL005321).

GLOBAL NAME: *Andropogon gerardii* – *Sorghastrum nutans* (*Sporobolus heterolepis*) – *Liatris* spp. – *Ratibida pinnata* Herbaceous Vegetation, *Andropogon gerardii* – *Sorghastrum nutans* – *Hesperostipa spartea* Loess Hills Herbaceous Vegetation.

OTHER NAMES: Central Tall-grass Big Bluestem Loess Prairie, Central Mesic Tall-grass Prairie, Dakota Sandstone Tall-grass Prairie, Big Bluestem – Indiangrass Western Great Plains Prairie, Sandhills Wet-mesic Tall-grass Prairie.

RANGE: This community occurs mostly in the eastern quarter of the State but extends westward in the eastern Sandhills and in the valley of the Platte and Loup Rivers.

ECOREGIONS: 25h, 27a, 27e, 27f, 27g, 44a, 44c, 44d, 47

ENVIRONMENTAL DESCRIPTION: This community occurs on level to moderately sloping ground of various aspects. Soils are usually deep and well-developed loams, sandy loams, silt loams, and silty clay loams formed in loess, glacial till or eolian sand (infrequently weathered sandstone or limestone).

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: big bluestem (*Andropogon gerardii*), smooth brome (*BROMUS INERMIS*), porcupine grass (*Hesperostipa spartea*), Kentucky bluegrass (*POA PRATENSIS*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), prairie dropseed (*Sporobolus heterolepis*)

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Hesperostipa spartea*, *Sorghastrum nutans*, *Sporobolus heterolepis*

VEGETATION DESCRIPTION: This community is dominated primarily by tall grasses 1–2 m tall, namely big bluestem with Indian grass also conspicuous at some sites. On well-drained slopes and ridges they may be co-dominant with little bluestem. On finer soils with higher clay content in the southeast, prairie dropseed is often common and even dominant in a few sites. Northward, and in sites with more silty or sandy soils porcupine grass may be common to locally abundant. On dry hill crests, particularly where mowed or grazed, short grasses including blue grama (*Bouteloua gracilis*) and hairy grama (*Bouteloua hirsuta*) are occasionally present, but are always subordinate to the tall and mid grasses. Patches of western wheatgrass (*Elymus smithii*) and blue grama may also be locally common in some clay pans associated with tall-grass prairie. Lower slopes often contain patches of switchgrass and Indian grass (and sometimes little bluestem), which may be locally common in uplands as well. Many prairies have been invaded by and are dominated by the exotic perennial grasses smooth brome and Kentucky bluegrass. Shrubs are scattered in the prairie, and are often associated with the moist draws, though plums (*Prunus americana*) may form thickets on the uplands. Leadplant commonly occurs as scattered small shrubs with dwarf prairie rose (*Rosa arkansana*), and in some places, redroot New Jersey tea (*Ceanothus herbaceus*). Common forbs include heath aster (*Aster ericoides*), bastard toadflax (*Comandra umbellata*), daisy fleabane (*Erigeron strigosus*), stiff sunflower (*Helianthus pauciflorus*), stiffstem flax (*Linum sulcatum*), silverleaf scurfpea (*Pediomelum argophyllum*), wild alfalfa (*Psoraleidum tenuiflorum*), and Missouri goldenrod (*Solidago missouriensis*). Smooth scouringrush (*Equisetum laevigatum*) is the only pteridophyte common in the prairie. Species diversity is moderate to relatively high.

This community also occurs in the eastern Sandhills and in parts of central and southern Nebraska generally considered to contain mixed-grass prairie. Westward, this community is increasingly limited to level slopes (often associated with subirrigated hay meadows in the Sandhills), and tends to be dominated almost exclusively by big bluestem and exotic grasses.

Species diversity is generally much lower in the western prairies, and little bluestem and sideoats grama (*Bouteloua curtipendula*) are generally present, but at low density.

OTHER NOTEWORTHY SPECIES: The federally threatened western prairie fringed orchid (*Platanthera praeclara*) occurs in this community type. Other uncommon species found in this community include *Aristida purpurascens*, *Asclepias amplexicaulis*, *Carex bushii*, *C. umbellata*, *Chaerophyllum tainturieri*, *Chenopodium pallescens*, *Dalea multiflora*, *Desmodium sessilifolium*, *Draba cuneifolia*, *Eryngium yuccifolium*, *Erysimum inconspicuum*, *Erythronium mesochoreum*, *Helianthus mollis*, *Krigia cespitosa*, *Liatris squarrosa* var. *hirsuta*, *Mirabilis albida*, *Nothoscordum bivalve*, *Orobanche uniflora*, *Pyrrhopappus carolinianus*, *Ranunculus fascicularis*, *Spiranthes lacera*, *S. vernalis*, *Tephrosia virginiana*, and *Triodanis biflora*.

STATE RANK: S1

RANK JUSTIFICATION: The vast majority of presettlement tall-grass prairie has been converted to cropland. The remaining examples have been extensively degraded by overgrazing, herbicide spraying, and invasion by smooth brome and Kentucky bluegrass.

GLOBAL RANK: G2

COMMENTS: As traditionally described, this community primarily contains the Central Tallgrass Big Bluestem Loess Prairie, and the Central Mesic Tall-grass Prairie communities of NatureServe. It is newly expanded here to include the Sandhills Wet-mesic Prairie of the 2000 classification. The species composition of Sandhills Wet-mesic Prairie falls completely within the range of species associated with tall-grass prairie, except for the fact that most Sandhills sites are associated with wet meadows and usually contains a very small percentage of hydrophytes from that community. For mapping purposes, it may be best to recognize such sites as a wet-meadow - tall-grass prairie mosaic. Wet-mesic Tall-grass Prairie is currently defined by us as tall-grass prairie containing a significant hydrophyte component (mostly prairie cordgrass or sedges). In some hay meadows associated with Sandhills outliers in northeastern Nebraska exist communities that appear to be a combination of Tall-grass Prairie and Dry-mesic Sand Prairie, and do not fit comfortably into either. Further surveys of outlying eolian sand prairie elsewhere are likely to reveal similar communities.

Lauver *et al.* (1999) attributes a Dakota Hills tallgrass prairie community to Nebraska in the Smoky Hills area in southern Jefferson and southwestern Gage Counties. To date only two prairies with sandy soil derived from Dakota sandstone have been inventoried in this area, which do not seem to differ significantly from other sandy tall-grass prairies. Some sandy prairies associated with river drainages are similar to tall-grass prairie of finer soils with the exception of the presence of some plants of sandy soils, such as sand lovegrass (*Eragrostis trichodes*). Furthermore, prairies associated with sandstone and limestone in southern Nebraska usually have the same dominant species as tall-grass prairie elsewhere in the State (Weaver, 1960), but which have numerous uncommon species often associated with rocky outcrops such as *Aristida purpurascens*, *Desmodium sessilifolium*, *Mentzelia oligosperma*, *Oenothera macrocarpa*, and *Opuntia humifusa*. They are similar to tall-grass prairie in overall species composition, but tend to have a higher percentage cover of little bluestem and some floristic differences. At this time

we are uncomfortable splitting tall-grass prairie on the basis of such floristic differences unless such distinctions are made on a statewide basis.

NatureServe's Western Great Plains Big Bluestem Prairie is a poorly defined community that covers western outliers of tall-grass prairie in regions without other tall-grass communities for comparison. It occurs along the Platte River west to the Panhandle, but when compared with tall-grass prairie farther east, cannot be maintained on the basis of anything other than geography.

In the mixed-grass prairie region of central Nebraska, this community may occur on level ground, often associated with mixed-grass prairie on adjacent slopes. These communities have much lower species diversity than tall-grass prairie in eastern Nebraska, but cannot be separated from them on the basis of dominants. Floristic differences between various tall-grass prairie communities may be required to distinguish the different types recognized by NatureServe.

EXEMPLARY SITES: Madigan Prairie in Saunders County, Table Rock Wildlife Management Area in Pawnee County.

REFERENCES:

- Kaul, R. B. and S. B. Rolfsmeier. 1987. The characteristics and phytogeographic affinities of the flora of Nine-Mile Prairie, a western tall-grass prairie in Nebraska. *Transactions of the Nebraska Academy of Sciences* 15:23–35.
- Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:91–113.
- Steiger, T. L. 1930. Structure of prairie vegetation. *Ecology* 11:170–217.
- Weaver, J. E. 1958. Native grassland of southwestern Iowa. *Ecology* 39:733–750.
- Weaver, J. E. 1960. Comparison of vegetation of Kansas-Nebraska drift-loess hills and loess plains. *Ecology* 41:73–88.

WET-MESIC TALLGRASS PRAIRIE

ELEMENT CODE: CEG002024

GLOBAL NAME: *Andropogon gerardii* – *Panicum virgatum* - *Helianthus grosseserratus*
Herbaceous Vegetation

OTHER NAMES: Prairie/Hayfield (Currier, 1982); Lowland (Floodplain) Prairie (Rolfsmeier, 1988); Big Bluestem Prairie (Weaver, 1960); Central Wet-Mesic Tallgrass Prairie

RANGE: This community occurs along rivers and larger streams, in the eastern quarter of the State, within the range of tall-grass prairie.

ECOREGIONS: 47

ENVIRONMENTAL DESCRIPTION: This community occurs primarily in floodplains and on terraces of river and stream valleys and in other low places such as ravines in uplands. Soils are deep sandy or silty loams formed in alluvium, loess, or glacial till and are somewhat poorly to moderately well drained. The water table is *ca.* 1 m below the surface, and standing water may be present from late winter into early spring or after heavy rains.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: big bluestem (*Andropogon gerardii*), smooth brome (*BROMUS INERMIS*), smallbeak sedge (*Carex brevior*), woolly sedge (*Carex pellita*), flatstem spikerush (*Eleocharis compressa*), Canada wildrye (*Elymus canadensis*), smooth scouringrush (*Equisetum laevigatum*), wild licorice (*Glycyrrhiza lepidota*), sawtooth sunflower (*Helianthus grosseserratus*), Kentucky bluegrass (*POA PRATENSIS*), rosinweed (*Silphium integrifolium*), Indian grass (*Sorghastrum nutans*), prairie cordgrass (*Spartina pectinata*), paniced aster (*Symphotrichum lanceolatum*), blue meadow violet (*Viola pratincola*)

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Anemone canadensis*, *Asclepias sullivantii*, *Carex missouriensis*, *Helianthus grosseserratus*, *Liatris pycnostachya*, *Spartina pectinata*, *Thalictrum dasycarpum*, *Vernonia fasciculata*, *Veronicastrum virginicum*, *Zizia aurea*

VEGETATION DESCRIPTION: The vegetation of this community is dense and consists primarily of tall grasses 1-2 m or more tall. Big bluestem is usually co-dominant with prairie cordgrass, with Canada wildrye, woolly sedge, and gama grass (*Tripsacum dactyloides*) locally common. In slightly wetter places such as in swales, prairie cordgrass may dominate. Patches of shrubs may be present, including roughleaf dogwood (*Cornus drummondii*), wild plum (*Prunus americana*), and wolfberry (*Symphoricarpos occidentalis*). Forbs are conspicuous, particularly fall-flowering composites such as sawtooth sunflower, goldenrods (*Solidago* spp.), and paniced aster. Other common forbs include Canada anemone (*Anemone canadensis*), prairie milkweed (*Asclepias sullivantii*), ragwort (*Senecio plattensis*), meadow rue (*Thalictrum dasycarpum*), spiderworts (*Tradescantia bracteata* and *T. ohiensis*), and ironweed (*Vernonia fasciculata*). Species diversity is relatively high.

OTHER NOTEWORTHY SPECIES: *Platanthera praeclara* may be present in this community. Other uncommon species include *Carex brachyglossa*, *Carex missouriensis*, *Cypripedium candidum*, *Eryngium yuccifolium*, *Lilium michiganense*, *Pedicularis canadensis*, *Ranunculus hispidus* var. *caricetorum*, *Scleria triglomerata*, *Senecio pseudoaureus*, *Trifolium reflexum*, and *Veronicastrum virginicum*

STATE RANK: S1

RANK JUSTIFICATION: The vast majority of these prairies have been converted to cropland. Remaining sites are often heavily grazed or hayed, and are often invaded by exotics, especially

smooth brome and Kentucky bluegrass. Some areas have been heavily invaded by shrubs and trees as a result of fire suppression.

GLOBAL RANK: G2G3

COMMENTS: Wet-mesic prairie is intermediate between wetland and upland, and tends to intergrade with wet prairie and tallgrass prairie communities. The community here described includes only wet-mesic prairie in the tall-grass prairie region of eastern Nebraska, but similar communities are likely present throughout the State. The Sandhills Wet-mesic Prairie of the 2000 classification is now included in the Tall-grass Prairie community. Most areas recorded as Sandhills Wet-mesic Prairie in the past are scarcely separable from tall-grass prairie, while some represent Dry-mesic Sand Prairie or a combination of the two. An unusual wet-mesic prairie type dominated by switchgrass, Indiangrass and Emory's sedge has been recorded from a floodplain terrace along the Loup River along the edge of the Sandhills. Further surveys are necessary before other wet-mesic prairie communities are described for the State. Some of the diagnostic forb species in this community may occur in upland tall-grass prairie in the extreme southeastern part of the State.

EXEMPLARY SITES:

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames: 317pp.

Rolfsmeier, S. B. 1988. The vascular flora and plant communities of Seward County, Nebraska. Transactions of the Nebraska Academy of Sciences 16:91-113.

Weaver, J. E. 1960. Flood plain vegetation of the central Missouri Valley and contacts of woodland with prairie. Ecological Monographs 30:37-64.

MISSOURI RIVER VALLEY DUNE GRASSLAND

ELEMENT CODE: CEGLO0000F

GLOBAL NAME: None presently designated.

OTHER NAMES:

RANGE: This community is on high terraces of the Missouri River in northeast Nebraska and in adjacent Iowa.

ECOREGIONS: 47d

ENVIRONMENTAL DESCRIPTION: This community occurs on gently to moderately sloping sand dunes on river terraces. Soils are poorly-developed sands formed from wind-blown alluvium and are well-drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: Canada wildrye (*Elymus canadensis*), switchgrass (*Panicum virgatum*), sand dropseed (*Sporobolus cryptandrus*)

DIAGNOSTIC SPECIES: *Corispermum villosum*, *Elymus canadensis*, *Sporobolus cryptandrus*

VEGETATION DESCRIPTION: This grassland probably represents a recently-stabilized sand prairie community and is sparsely vegetated even in comparison with other sand prairie. It currently is dominated by mid-grasses 0.5-1 m tall, primarily sand dropseed, with patches of Canada wildrye present in some areas. Cottonwoods (*Populus deltoides*) are scattered on the dunes, with patches of roughleaf dogwood (*Cornus drummondii*) often associated with them. In more level areas, switchgrass is more common and Siberian elm (*Ulmus pumila*) is present. Interdunal swales are often populated by switchgrass and Canada goldenrod (*Solidago canadensis*). Forb density and diversity is fairly low, with a few perennial prairie forbs such as western ragweed (*Ambrosia psilostachya*) round-headed bush clover (*Lespedeza capitata*) scattered here and there. Plains prickly pear (*Opuntia tortispina*) is present, but uncommon. Prairie shrubs such as smooth sumac (*Rhus glabra*) may form patches in places as well. In this community, species diversity is often highest in naturally and artificially disturbed areas of open sand, where native annuals and perennials such as woolly bugseed (*Corispermum villosum*), winged pigweed (*Cycloloma atriplicifolium*), Plains sunflower (*Helianthus petiolaris*), lemon scurfpea (*Psoralidium lanceolatum*), annual skeletonweed (*Shinnersoseris rostrata*) and sandgrass (*Triplasis purpurea*) are scattered to common. Overall species diversity for this community is lower than that of other sand prairie communities in Nebraska.

OTHER NOTEWORTHY SPECIES: Woolly bugseed (*Corispermum villosum*) is known in Nebraska only from this community.

STATE RANK: S1

RANK JUSTIFICATION: This community appears to be very limited in extent in the State.

GLOBAL RANK: G?

COMMENTS: This distinctive community was also reported in northwest Iowa by Eilers & Roosa (1994) in northwest Iowa, but apparently has not been classified by NatureServe. Most patches in Nebraska are relatively small (20-80 acres) and sometimes occurs as a patchy mosaic with riparian woodland. Along the unchannelized portion of the Missouri River at Ponca State Park, a very small area of sparsely-vegetated sand dunes borders the rivers. Even though they

are apparently fairly young, they contain woolly bugseed and are already being overtaken by trees.

EXEMPLARY SITES: The largest known site is at the Snyder-Winnebago Bend area in Thurston County.

REFERENCES:

Eilers, L.J. and D.M. Roosa. 1994. The Vascular Plants of Iowa. Iowa City, University of Iowa Press, 304pp.

MISSOURI RIVER FLOODPLAIN TERRACE GRASSLAND

ELEMENT CODE: CEGL00000G

GLOBAL NAME: None presently designated.

OTHER NAMES:

RANGE: This community is on high terraces of the Missouri River in northeast Nebraska and in adjacent Iowa.

ECOREGIONS: 47d

ENVIRONMENTAL DESCRIPTION: This community occurs on level ground river terraces. Soils are poorly-developed sands formed alluvium and are well-drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: smooth brome (*BROMUS INERMIS*), crested sedge (*Carex cristatella*), Canada wildrye (*Elymus canadensis*), switchgrass (*Panicum virgatum*), Kentucky bluegrass (*POA PRATENSIS*).

DIAGNOSTIC SPECIES: *Elymus canadensis*, *Panicum virgatum*

VEGETATION DESCRIPTION: This community is dominated by a relatively sparse layer of mid-tall grasses 1 m tall with switchgrass most common, and Canada wildrye also conspicuous, especially in slightly higher ground. Most sites are severely degraded and dominated by smooth brome and Kentucky bluegrass. Two weakly definable phases can be recognized: a switchgrass – bluegrass – sedge phase, which frequently borders wetlands, and a smooth brome – Kentucky bluegrass – Canada wildrye – switchgrass type, found on higher sites, often near woodland. Common scouringrush frequently replaces sedges in the first type, and switchgrass in the second. The lower phase may intergrade with wetland communities and may be invaded by reed

canarygrass (*Phalaris arundinacea*). The higher phase is commonly invaded by roughleaf dogwood, sometimes to such an extent as to transform it into a shrubland community. Overall species diversity is low.

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S?

RANK JUSTIFICATION: Most sites supporting this community have been converted to cropland or have succeeded to woodland.

GLOBAL RANK: G?

COMMENTS: This community is mentioned by Weaver (1960) as a transition between wet prairie and tall-grass prairie along the Missouri River. Apparently it may be restricted to a narrow band in southeast Nebraska, but in sandy soils upstream it is more extensive and may occur in place of tall-grass prairie, which is unknown in the Missouri River floodplain in northeast Nebraska. This community may intergrade with the Missouri River Valley Dune Grassland community and is usually highly degraded. It may extend westward along the Platte River, but no records of it are known.

This community tends to be fairly disturbed and probably was once maintained as open grassland by occasional wildfires. In the absence of fire, shrubs quickly invade, and many of these sites may eventually succeed to woodland. Currently they are mostly restricted to narrow bands along the margins of marshes and woodland and may grade into the surrounding communities to such a large extent they are difficult to identify in the field. Species composition varies based on minor differences in elevation and soil moisture, and frequently they are invaded by exotic species.

EXEMPLARY SITES: Sites are present at Ponca State Park in Dixon County, but are mostly invaded by trees.

REFERENCES:

Weaver, J. E. 1960. Flood plain vegetation of the central Missouri Valley and contacts of woodland with prairie. *Ecological Monographs* 30:37-64.

SOUTHERN SAND/GRAVEL MIXED-GRASS PRAIRIE

ELEMENT CODE: CEG005221

GLOBAL NAME: *Schizachyrium scoparium* – *Aristida basiramea* – *Sporobolus cryptandrus* – *Eragrostis trichodes* Herbaceous Vegetation.

OTHER NAMES:

RANGE: This community occurs on uplands on the north side of the Little Blue River in western Jefferson and Thayer counties, and on the north side of the Republican River valley in Nuckolls and Webster counties.

ECOREGIONS: 27b, 27f

ENVIRONMENTAL DESCRIPTION: This community occurs on eroded slopes, rolling uplands and in shallow draws on the north side of river valleys. It occurs in sandy-gravelly soils of the Meadin series that are very well drained.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: purple three-awn (*Aristida purpurea*), forktip three-awn (*A. basiramea*), western sagewort (*Artemisia campestris* var. *caudata*), blue grama (*Bouteloua gracilis*), hairy grama (*B. hirsuta*), sand lovegrass (*Eragrostis trichodes*), hairy golden-aster (*Heterotheca villosa*), little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), yucca (*Yucca glauca*)

DIAGNOSTIC SPECIES: *Aristida basiramea*, *Artemisia campestris* var. *caudata*, *Eragrostis trichodes*, *Froelichia gracilis*, *Polygonum tenue*, *Sporobolus cryptandrus*

VEGETATION DESCRIPTION: This is a moderately vegetated mixed-grass prairie community occurring in sandy and gravelly soils in a predominantly tall-grass prairie region of silty soils. Species diversity is variable based on soil texture. In areas with predominately gravelly soils, primary species include blue grama and little bluestem, while sand lovegrass and sand dropseed are more common where soils are primarily sandy. Scattered tall-grasses such as big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*) may be present near the contact of these areas with tall-grass prairie. Forbs are often conspicuous and include many species common in mixed-grass prairie farther west such as western sagewort, hairy golden-aster, Plains yellow primrose (*Calylophus serrulatus*), yellow woollywhite (*Hymenopappus tenuifolius*), cutleaf ironplant (*Machaeranthera pinnatifida*), and Plains prickly pear (*Opuntia tortispina*), in addition to many annual species typical of sandy prairies. Snake cotton (*Froelichia gracilis*), and slender knotweed (*Polygonum tenue*) are annual forbs that are mostly restricted to gravelly sites. Ledge spike-moss (*Selaginella rupestris*) is often a common in many gravelly sites along with numerous non-vascular cryptogams. Yucca (*Yucca glauca*) is often common on slopes. Species diversity is moderate to relatively high.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3?

RANK JUSTIFICATION: Although the extent of this community is fairly well established, its full condition has not been assessed. In generally, sandier sites north of the Republican appear to be in poorer condition than gravelly sites.

GLOBAL RANK: G?

COMMENTS: This community was more broadly defined in the 2000 classification to include certain examples of sandy tallgrass prairie and sandy-gravelly sites in southwest Nebraska which are now included in the Western Gravel Flats community. The presence of a numerous mixed-grass prairie species separates it from sandy tall-grass prairie. This community needs further study, as descriptions are based mostly on casual surveys of a few sites.

EXEMPLARY SITES: Alexandria Wildlife Management Area in Jefferson County.

REFERENCES:

WESTERN FLOODPLAIN TERRACE GRASSLAND

ELEMENT CODE: CEG001580, CEG001583

GLOBAL NAME: *Pascopyrum smithii* – *Distichlis spicata* Herbaceous Vegetation, *Pascopyrum smithii* – *Nassella viridula* Herbaceous Vegetation.

OTHER NAMES: alkaline floodplain community (Hildebrand, 1997), alkaline intermittent stream bottom, in part (Steinauer & Rolfsmeier, 1997)

RANGE: This community is found along rivers and in stream valleys through at least the western half of the Panhandle from Dawes and Sioux counties southward to Kimball County.

ECOREGIONS: 25d, 25g, 43

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level ground in floodplains of rivers and streams, including ephemeral streams. These areas may flood briefly in spring or following heavy rains but are usually somewhat well-drained. Soils are slightly to moderately alkaline clay loams, silt loams, and sandy loams formed in alluvium.

COWARDIN WETLAND SYSTEM: Palustrine, emergent, intermittently flooded.

MOST ABUNDANT SPECIES:

Herbaceous: inland saltgrass (*Distichlis spicata*), western wheatgrass (*Elymus smithii*), green needlegrass (*Nassella viridula*), Kentucky bluegrass (*POA PRATENSIS*)

DIAGNOSTIC SPECIES: *Cirsium flodmanii*, *Elymus smithii*, *Equisetum laevigatum*, *Glycyrrhiza lepidota*

VEGETATION DESCRIPTION: This community is dominated by herbaceous graminoids *ca.* 1 m tall with western wheatgrass the dominant native species. Two intergrading phases are recognized: (these phases intergrade freely, particularly in the Oglala National Grasslands)

1) western wheatgrass – green needlegrass (Kentucky bluegrass) phase - is dominated primarily by western wheatgrass, with green needlegrass common in silty and clay soils, and Kentucky bluegrass frequently abundant as well. Scattered cottonwood (*Populus deltoides*) trees and patches of shrubs, most commonly wolfberry (*Symphoricarpos occidentalis*), are typical, though silver sagebrush (*Artemisia cana*) may be frequently common in the Oglala National Grasslands. Native forbs are scattered to common, particularly near streambanks, and include wild licorice (*Glycyrrhiza lepidota*), prairie coneflower (*Ratibida columnifera*), Flodman's thistle (*Cirsium flodmanii*), and white sage (*Artemisia ludoviciana*). Grazed areas may contain much blue grama (*Bouteloua gracilis*), and many sites are commonly invaded by exotics, with smooth brome (*Bromus inermis*), sweetclover (*Melilotus* spp.), Canada thistle (*Cirsium arvense*), cheatgrass (*Bromus* spp.) and Kentucky bluegrass among the most abundant. Species diversity is low to moderate.

2) western wheatgrass – inland saltgrass phase - which occurs in slightly more alkaline soils, is dominated by western wheatgrass and inland saltgrass, and contains fewer woody species and forbs, though other halophytic graminoids such as scratchgrass (*Muhlenbergia asperifolia*) and alkali sacaton (*Sporobolus airoides*) may be present. This area is prone to disturbance and invasion by Canada thistle and Russian orache (*Atriplex heterosperma*), and in general has very low species diversity.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3

RANK JUSTIFICATION: The overall range of this community is unknown, it is fairly extensive where it occurs, though frequently very degraded.

GLOBAL RANK: G4

COMMENTS: This is a very heterogeneous community will probably need to be split in the future. The wheatgrass –green needlegrass phase of this community seems identical to the Wheatgrass Basin Prairie of the 2000 classification (which in turn was often confused with the Wheatgrass Playa Grassland in practice). Both are probably best included in the *Pascopyrum smithii* – *Nassella viridula* Herbaceous Vegetation of NatureServe and are therefore combined here. The distinctions between the alkaline phase of this community and the Western Alkaline Meadow community need to be investigated. The extremes are distinct, but in many places (such as the Oglala National Grasslands) they mix together to such a degree as to be nearly inseparable. It is possible that the Alkaline Intermittent Stream Bottom community of Steinauer and Rolfsmeier (1997) may belong here.

EXEMPLARY SITES: Extensive occurrences of this community are found along the Niobrara River at Agate Fossil Beds National Monument in Sioux County.

REFERENCES:

- Hildebrand, T. J. 1997. Ecological evaluation: Oglala Pasture 1N potential research natural area, Nebraska National Forest, Sioux County, Nebraska. Report to the Nature Conservancy Midwest Regional Office, Minneapolis, Minnesota: 22pp. plus appendices.
- Jones, G. P. and G. M. Walford. 1995. Major riparian vegetation types of Eastern Wyoming. Report to the Wyoming Department of Environmental Quality Water Quality Division. 245pp.
- Rolfsmeier, S. B. 1998. A vegetational survey of selected riparian areas on the Oglala National Grasslands in Dawes and Sioux Counties, Nebraska. Unpublished report to the Nebraska Natural Heritage Program, Game & Parks Commission, Lincoln: 22 pp.

SILVER SAGEBRUSH SHRUB PRAIRIE

ELEMENT CODE: C EGL001072

GLOBAL NAME: *Artemisia cana* / *Pascopyrum smithii* Shrubland

OTHER NAMES; Basin silver sagebrush/Western wheatgrass community (Jones & Walford, 1995); Silver sagebrush shrubland (Steinauer & Rolfsmeier, 1997), Silver sagebrush/Western Wheatgrass Shrub Prairie, Hat Creek Basin Terrace Prairie, Sideoats-Sandreed Terrace Prairie (Steinauer & Rolfsmeier, 2000).

RANGE: This community is known only from the White River and Hat Creek drainages in Dawes and Sioux County.

ECOREGION: 43g

ENVIRONMENTAL DESCRIPTION: This community occurs on terraces in the floodplains of intermittent streams, and perhaps also on adjacent uplands. Soils are moderately deep, poorly drained loams, silty loams, and sandy loams formed in alluvium. These sites may be briefly inundated following heavy rains.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: silver sagebrush (*Artemisia cana*)

Herbaceous: blue grama (*Bouteloua gracilis*), buffalograss (*Buchloë dactyloides*), western wheatgrass (*Elymus smithii*), needle-and-thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*), prairie dropseed (*Sporobolus cryptandrus*)

DIAGNOSTIC SPECIES: *Artemisia cana*, *Elymus smithii*, *Hesperostipa comata*, *Sporobolus cryptandrus*

VEGETATION DESCRIPTION: This community is dominated by mid- and short-grasses ≤ 1 m tall. Western wheatgrass is usually dominant, with needle-and-thread conspicuous and co-dominant, while blue grama and buffalo-grass are abundant locally in some sites. Other grasses frequently present include sand dropseed and green needlegrass, and at a few sites (particularly in sandy loams) prairie sandreed (*Calamovilfa longifolia*) may be abundant. In the Hat Creek basin of Nebraska, silver sagebrush is usually present in this community, though it rarely occurs at a density high enough for this community to be regarded as shrubland. Forb density is typically low, and the most frequently encountered forbs include slender-flower scurfpea (*Psoralidium tenuiflorum*), prickly pears (*Opuntia polyacantha* and *O. tortispina*), skeletonplant (*Lygodesmia juncea*), scarlet globe mallow (*Sphaeralcea coccinea*), and scarlet gaura (*Gaura coccinea*). Exotics are usually present and may be common, with sweetclovers (*Melilotus* spp.), Japanese brome (*Bromus japonicus*), and yellow goat's-beard (*Tragopogon dubius*) the most frequent.

In the adjacent White River Drainage this community is replaced by a sideoats-sandreed phase dominated by sideoats grama (*Bouteloua curtipendula*) and/or little bluestem (*Schizachyrium scoparium*), with prairie sandreed often common. It tends to have a lower density of shrubs, with wolfberry (*Symphoricarpos occidentalis*) sometimes locally common with silver sagebrush. Forb density is lower can be locally common. These sites also tend to have a slightly higher forb diversity, with frequently represented species including fringed sage (*Artemisia frigida*), white sage (*A. ludoviciana*), broom snakeweed (*Gutierrezia sarothrae*), slender-flower scurfpea (*Psoralidium tenuiflorum*), and yucca (*Yucca glauca*). These sites intergrade near the divide of the two drainages. Species diversity is low to moderate overall.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S?

RANK JUSTIFICATION: This community appears widespread in the Hat Creek Basin and is protected in several sites in the Oglala National Grassland. It is unclear how this community compares to presettlement vegetation, and this may represent a degraded phase of a community not described for Nebraska.

GLOBAL RANK: G4

COMMENTS: This community appears to be part of the silver sagebrush shrubland community of Steinauer and Rolfsmeier (1997). Silver sagebrush rarely occurs at densities high enough to be regarded as shrubland, and occurs in more than one grassland type as well (it is also common in the Western Floodplain Terrace Meadow community, at least in the Hat Creek Basin). Hildebrand's (1997) report of silver sagebrush shrubland in Nebraska appears to represent this community. This community is at the eastern limit of its distribution in extreme northwestern Nebraska, but may also occur in Dawes, Scotts Bluff, and Sheridan counties. The *Nassella*-

Pascopyrum-Artemisia cana terrace prairie community of Rolfsmeier (1998) is included here until further study can determine its proper disposition.

The White River phase of this community has been provisionally put in either NatureServe's *Artemisia cana* / *Pascopyrum smithii* Shrubland or *Calamovilfa longifolia* – *Hesperostipa comata* Herbaceous Vegetation, but it does not fit either very well. It is included with the Silver Sagebrush shrubland of the Hat Creek drainage because it occupies a similar position in the landscape, and the two have been observed to mix together along Whitehead Creek north of Toadstool geologic park in Sioux County. The differences in its species composition may be due to the influence of species associated with nearby communities of the Pine Ridge area.

EXEMPLARY SITE: Extensive examples of the Hat Creek phase are found along Hat Creek in Pasture 15 of the Oglala National Grasslands in northern Sioux County, and examples of the White River phase are best developed along Sand Creek east of Toadstool Rd. in Pasture 40W of the Oglala National Grasslands in Dawes County.

REFERENCES:

- Hildebrand, T. J. 1997. Ecological evaluation: Oglala Pasture 1N potential research natural area, Nebraska National Forest, Sioux County, Nebraska. Report to the Nature Conservancy Midwest Regional Office, Minneapolis, Minnesota: 22pp. plus appendices.
- Jones, G. P. and G. M. Walford. 1995. Major riparian vegetation types of eastern Wyoming. Report to the Wyoming Department of Environmental quality: 245pp.
- Rolfsmeier, S. B. 1998. A vegetational survey of selected riparian areas on the Oglala National Grasslands in Dawes and Sioux Counties, Nebraska. Unpublished report to the Nebraska Natural Heritage Program, Game & Parks Commission, Lincoln: 22 pp.

GREASEWOOD SHRUB PRAIRIE

ELEMENT CODE: CEG001508

GLOBAL NAME: *Sarcobatus vermiculatus* / *Pascopyrum smithii* – (*Elymus lanceolatus*) Shrub Herbaceous Vegetation

OTHER NAMES: Black greasewood/western wheatgrass community (Jones & Walford, 1995), Greasewood/Western Wheatgrass Shrub Prairie, Greasewood shrub prairie (Steinauer & Rolfsmeier, 1997), Arvada Shrub Prairie

RANGE: This community is probably restricted to the Hat Creek Basin in northern Sioux County, but is also possible in northern Dawes and Sheridan counties, and in Scotts Bluff County.

ECOREGIONS: 43g

ENVIRONMENTAL DESCRIPTION: This community occurs in nearly level ground on upland terraces adjacent to stream valleys in the Hat Creek Basin. Soils are poorly drained alkaline clay and silty clay loams formed in weathered shale (all known Nebraska occurrences are in loams of the Arvada series). Salt crusts may form in slight depressions.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: rubber rabbitbrush (*Ericameria nauseosa* var. *glabrata*), greasewood (*Sarcobatus vermiculatus*)

Herbaceous: blue grama (*Bouteloua gracilis*), buffalograss (*Buchloë dactyloides*), inland saltgrass (*Distichlis spicata*), western wheatgrass (*Elymus smithii*), spine-fruit prickly pear (*Opuntia polyacantha*), alkali sacaton (*Sporobolus airoides*)

DIAGNOSTIC SPECIES: *Elymus smithii*, *Opuntia polyacantha*, *Sarcobatus vermiculatus*, *Sporobolus airoides*

VEGETATION DESCRIPTION: The vegetation of this community is relatively sparse and dominated by mid grasses < 1 m tall. Western wheatgrass is by far the most common species. Other common graminoids that may be abundant locally include blue grama, buffalograss, and inland saltgrass along with exotics such as cheatgrass (*Bromus japonicus*, *B. squarrosus*, and *B. tectorum*). A medium-tall (0.5–1.5 m) shrub overlayer of greasewood is sometimes present, but cover is rarely dense enough to qualify as shrubland. Rabbitbrush may also be common locally, along with four-wing saltbush (*Atriplex canescens*). Many sites contain no shrub layer, but have an abundance of prickly pear. These sites are commonly associated with clay pans. Forbs are uncommon in this community, and two-grooved milkvetch (*Astragalus bisulcatus*) is one of the few conspicuous species. Species diversity is low.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S2

RANK JUSTIFICATION: This community is of limited extent in Nebraska. Heavy grazing may increase the likelihood of invasion of exotics such as cheatgrass and fluffweed (*Logfia arvensis*).

GLOBAL RANK: G4

COMMENTS: This community is poorly studied and may be a combination of several types or subtypes. The NatureServe name seems to apply to intermittently flooded sites, but most Nebraska sites are on high upland terraces. A few areas of steep eroded clay banks covered with greasewood are known along Indian Creek and near Hat Creek in Sioux County, and probably

are best regarded as a phase of this community. At least in the Oglala National Grasslands, prairie dogs are often associated with this community.

EXEMPLARY SITES: Extensive sites are found in Pastures 1N and 15 in the Oglala National Grasslands in Sioux County.

REFERENCES:

Hildebrand, T. J. 1997. Ecological evaluation: Oglala Pasture 15 potential research natural area, Nebraska National Forest, Sioux County, Nebraska. Report to the Nature Conservancy Midwest Regional Office, Minneapolis, Minnesota: 22pp. plus appendices.

Jones, G. P., and G. M. Walford. 1995. Major riparian vegetation types of eastern Wyoming. Report to the Wyoming Department of Environmental Quality: 245pp.

SHORTGRASS PRAIRIE

ELEMENT CODE: CEGL001756

GLOBAL NAME: *Bouteloua gracilis* - *Buchloë dactyloides* Herbaceous Vegetation

OTHER NAMES: Short-grass type (Hopkins, 1951), Grama-Buffer-grass Association (Pool, 1914); Blue Grama - Buffalograss Herbaceous Vegetation

RANGE: This community is found primarily in the Panhandle, but is possible throughout the western half of the State.

ECOREGIONS: 25, 43

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level to rolling uplands. Soils are well-drained fine sandy loams, silty loams, or silty clays formed in sandstone, siltstone, shale, loess, and eolian sand.

COWARDIN WETLAND SYSTEM: upland

MOST ABUNDANT SPECIES:

Herbaceous: purple three-awn (*Aristida purpurea*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), buffalograss (*Buchloë dactyloides*), sixweeks fescue (*Festuca octoflora*), woolly plantain (*Plantago patagonica*)

DIAGNOSTIC SPECIES: *Bouteloua gracilis*, *Buchloë dactyloides*

VEGETATION DESCRIPTION: This community consists of a moderate to relatively dense sod of short grasses <0.5 m tall. Patches of blue grama often dominate, with the intervening spaces filled by buffalograss and scattered mid (*ca.* 1 m tall) grasses including prairie three-awn, sideoats grama, western wheatgrass (*Elymus smithii*), little bluestem (*Schizachyrium scoparium*),

sand dropseed (*Sporobolus cryptandrus*), and needle-and-thread (*Hesperostipa comata*), and ephemeral annuals including six-weeks fescue and woolly plantain. Shrubs are seldom present. Frequent forbs include milkvetches (*Astragalus* spp.), scarlet gaura (*Gaura coccinea*), cutleaf ironplant (*Machaeranthera pinnatifida*), spine-fruit prickly pear (*Opuntia polyacantha*), purple locoweed (*Oxytropis lambertii*), slender-flower scurfpea (*Psoraleidium tenuiflorum*), prairie coneflower (*Ratibida columnifera*), and scarlet globe mallow (*Sphaeralcea coccinea*). Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S2?

RANK JUSTIFICATION: The range and extent of existing tracts of this community is unknown at present. The decline in populations of prairie dogs may have resulted in invasion of many former sites by mid and tall grasses. Heavy grazing by cattle may increase the extent of the community in some areas by altering mixed-grass prairie temporarily to short-grass prairie.

GLOBAL RANK: G4

COMMENTS: The presettlement extent of this community in Nebraska may have been determined by the extent of prairie dogs and large bison herds. Presently, heavy grazing by cattle, drought, and regular mowing may also promote short-grass disclimax in areas of mixed-grass prairie. Pool's (1914) description of this community in the Sandhills appears to represent a mosaic of this community within the Sandhills Dry Valley Prairie. Large areas of western Nebraska considered short grass prairie by other authors is classified as Western Mixed-grass Prairie here.

EXEMPLARY SITES:

REFERENCES:

Hopkins, H. H. 1951. Ecology of the native vegetation of the loess hills in central Nebraska. Ecological Monographs 21:125–147.

Pool, R. J. 1914. A study of the vegetation of the sandhills of Nebraska. Minnesota Botanical Studies 4:189–312.

LOESS BLUFF PRAIRIE

ELEMENT CODE: CEG002035

GLOBAL NAME: *Schizachyrium scoparium* - *Bouteloua curtipendula* - *Bouteloua hirsuta* - (*Yucca glauca*) Herbaceous Vegetation

OTHER NAMES: Loess Hills Little Bluestem Dry Prairie

RANGE: This community is found on bluffs primarily along the south side of the Missouri River from Dixon County westward to Knox County, and may be scattered southward along the Missouri River and westward along the Niobrara River.

ECOREGIONS: 47k

ENVIRONMENTAL DESCRIPTION: This community occurs on steep to nearly level slopes atop bluffs. Soils are shallow and rapidly drained silt loams formed in loess. The community is best developed on slopes with a south or west aspect.

COWADIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: big bluestem (*Andropogon gerardii*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), porcupine grass (*Hesperostipa spartea*), little bluestem (*Schizachyrium scoparium*)

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Anemone patens*, *Bouteloua curtipendula*, *B. hirsuta*, *Castilleja sessiliflora*, *Dalea candida* var. *oligophylla*, *Dalea enneandra*, *Yucca glauca*

VEGETATION DESCRIPTION: This community is dominated by a layer of tall grasses 1-2 m tall and mid grasses ca. 1 m tall including big bluestem, sideoats grama, and little bluestem. A short grass underlayer of blue grama and hairy grama is commonly present. Scattered shrubs are present, including species typical of tall-grass prairie, such as leadplant (*Amorpha canescens*), redroot New Jersey tea (*Ceanothus herbaceus*), and dwarf prairie rose (*Rosa arkansana*) in addition to western shrubs such as buffaloberry (*Shepherdia argentea*) and yucca (*Yucca glauca*). Forbs of western (Great Plains region) phytogeographic affinity are conspicuous, and include pasque-flower (*Anemone patens*), lotus-leaved milkvetch (*Astragalus lotiflorus*), Missouri milkvetch (*A. missouriensis*), Great Plains Indian paintbrush (*Castilleja sessiliflora*), white prairie clover (*Dalea candida* var. *oligophylla*), nine-anther dalea (*Dalea enneandra*), scarlet gaura (*Gaura coccinea*), stiffstem flax (*Linum rigidum*), cutleaf ironplant (*Machaeranthera pinnatifida*), purple locoweed (*Oxytropis lambertii*), white beardtongue (*Penstemon albidus*), and scarlet globe mallow (*Sphaeralcea coccinea*). Species diversity is moderate.

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S2

RANK JUSTIFICATION: This community has a restricted distribution, and most occurrences have been converted to cropland or overgrazed.

GLOBAL RANK: G3

COMMENTS: This community is poorly studied in Nebraska and may not be separable from the Loess Mixed-grass Prairie community, or in some cases, with the Tall-grass Prairie community. In Cedar and Knox Counties, this prairie type may be associated with areas of chalky limestone outcrops, which have unique suites of species. The status of these sites needs to be evaluated.

EXEMPLARY SITES: Wiseman Wildlife Management Area in Cedar County, and along the south side of Lewis and Clark Lake in Knox County

REFERENCES:

Novacek, J. M., D. Roosa, and W. M. Pusateri. 1985. The vegetation of the loess hills landform along the Missouri River. *Proceedings of the Iowa Academy of Sciences* 92:199-212.

LOESS MIXEDGRASS PRAIRIE

ELEMENT CODE: C EGL002036

GLOBAL NAME: *Schizachyrium scoparium* - *Bouteloua curtipendula* Loess Mixedgrass
Herbaceous Vegetation

OTHER NAMES: Mixed-grass type (Hopkins, 1951); Little bluestem loess mixed-grass prairie

RANGE: This community is found on the loess-mantled hills and plains of central, south-central, southwestern and portions of northeastern Nebraska.

ECOREGIONS: 27b, 27e

ENVIRONMENTAL DESCRIPTION: This community occurs on steep to nearly level slopes in level, rolling, and dissected loess plains. Soils are deep silt loams formed in loess, and are moderately to rapidly well-drained. Some sites are associated with outcrops of sandstone, limestone or shale (see comments section below).

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: leadplant (*Amorpha canescens*)

Herbaceous: western ragweed (*Ambrosia psilostachya*), big bluestem (*Andropogon gerardii*), side-oats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), western wheatgrass (*Elymus smithii*), Kentucky bluegrass (*POA PRATENSIS*), slender-flower scurfpea (*Psoralidium tenuiflorum*), little bluestem (*Schizachyrium scoparium*), yucca (*Yucca glauca*)

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *Bouteloua curtipendula*, *B. gracilis*, *Mimosa quadrivalvis* var. *nuttallii*, *Schizachyrium scoparium*

VEGETATION DESCRIPTION: This community is dominated by a mixture of tall (1–2 m) and mid (0.5–1 m) grasses, often with an understory of short (<0.5 m) grasses. On nearly level ridgetops and toe slopes, blue grama often dominates the short-grass layer, often occurring with western wheatgrass and lesser amounts of sideoats grama, little bluestem and big bluestem. In some sites, particularly where heavy grazing has occurred at some time, the short grasses blue grama and buffalo grass (*Buchloë dactyloides*) may dominate, along with exotic grasses such as Japanese brome (*Bromus japonicus*). On slopes (particularly steep slopes), the mid-grasses little bluestem and sideoats grama may dominate or may share dominance with big bluestem. On lower slopes and the bottoms of draws, tall and mid-grasses dominate, including big bluestem, sideoats grama, and western wheatgrass. Switchgrass (*Panicum virgatum*) is abundant in bottoms of draws at one site, though in most places the bottoms are heavily grazed and invaded by western wheatgrass, buffalograss (in areas), and exotics. Kentucky bluegrass is the most abundant exotic invader in this community, with smooth brome (*Bromus inermis*) abundant at some sites. Eastern red cedar (*Juniperus virginiana*) is often invasive on steep north and east-facing slopes, and other shrubs may also form patches among them, including chokecherry (*Prunus virginiana*), smooth sumac (*Rhus glabra*), and wolfberry (*Symphoricarpos occidentalis*). Scattered leadplant are the most common short shrub on slopes not infested with juniper, and in places sandsage (*Artemisia filifolia*), skunkbrush sumac (*Rhus aromatica*), and western poison ivy (*Toxicodendron rydbergii*) are locally common. Yucca is often common in uplands especially where soils are sandier. Common forbs include western ragweed, fringed sage (*Artemisia frigida*), prairie coneflower (*Ratibida columnifera*), scarlet globe mallow (*Sphaeralcea coccinea*), scarlet gaura (*Gaura coccinea*), broom snakeweed (*Gutierrezia sarothrae*), Plains evening primrose (*Calylophus serrulatus*), heath aster (*Symphyotrichum ericoides*), slender-flower scurfpea (*Psoralidium tenuiflorum*), silverleaf scurfpea (*Pediomelum argophyllum*), daisy fleabane (*Erigeron strigosus*), and Missouri goldenrod (*Solidago missouriensis*). Ungrazed sites, particularly eastward, may be dominated by big bluestem to the extent they are difficult to distinguish from tall-grass prairie communities. Species diversity is moderate to relatively high in well-preserved sites.

OTHER NOTEWORTHY SPECIES: Species uncommon in Nebraska which are present in this community include *Allium drummondii*, *Amorpha nana*, *Chaetopappa ericoides*, *Erysimum inconspicuum*, *Minuartia michauxii* var. *texana*, *Pediomelum cuspidatum*, *Symphyotrichum fendleri*, *Triodanis holzingeri*.

STATE RANK: S3

RANK JUSTIFICATION: This community has largely been converted to cropland, though numerous sites remain in some parts of the State, especially on dissected river breaks. The majority of remaining sites are overgrazed and invaded by exotics, particularly smooth brome. Herbicide spraying for noxious weeds has greatly reduced the plant species diversity over large areas of this community type.

GLOBAL RANK: G3?

COMMENTS: Hopkins (1951) reports short-grass prairie in the loess hills of central Nebraska. These may, in part, be consequences of the drought of the 1930's and the fact that most of his sites he studied were regularly mowed. A calcareous mixed-grass prairie subtype may be associated with limestone outcroppings near the Kansas border. Rock outcrops occur as inclusions at many sites. In south-central Nebraska, limestone outcrops are frequently associated with the Republican River, while sandstone outcrops may be present in southwest Nebraska. Some or all of these may represent distinct subtypes or separate communities, but more data are needed before these can be recognized as separate from loess mixed-grass prairie.

EXEMPLARY SITES: Well-preserved sites are present at Red Willow Reservoir in Frontier County and Jeffrey Reservoir in Lincoln County.

REFERENCES:

Hopkins, H. H. 1951. Ecology of the native vegetation of the loess hills in central Nebraska. *Ecological Monographs* 21:125–147.

Hulett, G. K., C. D. Sloan, and G. W. Tomanek. 1968. The vegetation of remnant grasslands in the loessial region of northwestern Kansas and southwestern Nebraska. *The Southwestern Naturalist* 13:377–391.

Rothenberger, S. J. 1994. Floristic analysis of the C. Bertrand and Marian Othmer Schultz Prairie, a mixed-grass prairie in south-central Nebraska. *Transactions of the Nebraska Academy of Sciences* 21:21–30.

Weaver, J. E. and W. E. Bruner. 1948. Prairies and pastures of the dissected loess plains of central Nebraska. *Ecological Monographs* 18:507–549.

WESTERN MIXEDGRASS PRAIRIE

ELEMENT CODE: CEGl002037

GLOBAL NAME: *Hesperostipa comata* - *Bouteloua gracilis* - *Carex filifolia* Herbaceous Vegetation

OTHER NAMES: Needle-and-Thread - Blue Grama Mixed-grass Prairie

RANGE: This community is common in most of the Nebraska Panhandle with the exception of the extreme northwest and east-central parts and in portions of southwestern Nebraska in Keith and Chase Counties. It also occurs north of the Niobrara River in northeastern Cherry and Keya Paha counties.

ECOREFIONS: 25, 27e?, 43

ENVIRONMENTAL DESCRIPTION: This community occurs on level uplands and gentle to moderate slopes of various aspect. Soils are well drained and relatively shallow to deep sandy loams and silty loams formed in colluvium, loess, and weathered sandstone or siltstone.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), threadleaf sedge (*Carex filifolia*), western wheatgrass (*Elymus smithii*), sixweeks fescue (*Festuca octoflora*), needle-and-thread (*Hesperostipa comata*)

DIAGNOSTIC SPECIES: *Carex filifolia*, *Hesperostipa comata*

VEGETATION DESCRIPTION: This community is dominated by short graminoids, primarily threadleaf sedge and blue grama, with a sparse to moderate layer of mid-grasses ca. 1 m tall, usually dominated by needle-and-thread. Ungrazed sites in the Panhandle are dominated almost entirely by threadleaf sedge and/or needle-and-thread, which decrease with grazing. Blue grama increases under high grazing intensity and heavily grazed sites may convert to short-grass prairie. Heavily disturbed areas, which are subsequently abandoned, may become heavily invaded by western wheatgrass and exotic weedy annuals such as cheatgrass (*Bromus japonicus*, *B. tectorum*). Other frequent grasses include prairie sandreed, six-weeks fescue, sand dropseed (*Sporobolus cryptandrus*), green needlegrass (*Nassella viridula*) and purple three-awn (*Aristida purpurea*). Shrubs are scattered in this community. The most common shrub is skunkbrush sumac (*Rhus aromatica*), with winterfat (*Kraschennikovia lanata*) abundant at some sites. The subshrubs fringed sage (*Artemisia frigida*) and broom snakeweed (*Gutierrezia sarothrae*) may also be common. The most common forbs are those typical of other mixed-grass prairies in the State, and include scarlet gaura (*Gaura coccinea*), dotted gayfeather (*Liatris punctata*), skeletonplant (*Lygodesmia juncea*), cutleaf ironplant (*Machaeranthera pinnatifida*), lemon scurfpea (*Psoralidium lanceolatum*), and scarlet globe mallow (*Sphaeralcea coccinea*). Species diversity is low in ungrazed and heavily grazed sites, and moderate in moderately grazed sites. Some sites in Keya Paha County have high species diversity. Rock outcrops are frequently present as inclusions within this community, and are usually dominated by scattered perennial forbs. In the Panhandle, these inclusions are dominated by species typical of the Rock Outcrop community.

OTHER NOTEWORTHY SPECIES: Species uncommon in this community include *Astragalus pectinatus*, *Coryphantha missouriensis*, *Echinocereus viridiflorus*, *Elymus spicatus*, *Erigeron caespitosus*, *E. flagellaris*, *Juniperus horizontalis*, *Pediomelum linearifolium*, and *Potentilla hippiana* ssp. *effusa*.

STATE RANK: S3S4

RANK JUSTIFICATION: This community is still fairly common in western Nebraska, especially in Sioux County and along the breaks of the North Platte River. Many sites have been degraded by overgrazing.

GLOBAL RANK: G5

COMMENTS: Eastward, this community grades into other, usually more sandy prairie types. Kaul *et al.* (1983) reported blue grama dominating ungrazed sites in Keith County, and Harrison (1980) describes sites that appear to be intermediate between this community and Sandhills prairie along the central Niobrara River. Many sites north of the Niobrara River intergrade freely with sandy prairie communities.

EXEMPLARY SITES: Scotts Bluff National Monument in Scotts Bluff County.

REFERENCES:

- Harrison, A. T. 1980. The Niobrara Valley Preserve: Its biogeographic importance and description of its biotic communities. A working report to the Nature Conservancy Midwest Regional Office, Minneapolis, Minnesota: 116pp.
- Kaul, R. B., Challaiah, and Keeler, K. H. 1983. Effects of grazing and juniper-canopy closure on the prairie flora in Nebraska high-plains canyons. Proceedings of the seventh North American Prairie Conference:95–105.
- The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.
- Tolstead, W. L. 1941. Plant communities and secondary succession in south-central South Dakota. Ecology 22:322–328.
- Tolstead, W. L. 1942. Vegetation of the north part of Cherry County, Nebraska. Ecological Monographs 12:255–292.

NORTHWESTERN MIXEDGRASS PRAIRIE

ELEMENT CODE: CEGl001579 (includes CEGl002270)

GLOBAL NAME: *Pascopyrum smithii* – *Bouteloua gracilis* – *Carex filifolia* Herbaceous Vegetation (*Bouteloua gracilis* – *Buchloe dactyloides* Xeric Soil Herbaceous Vegetation as an inclusion)

OTHER NAMES:

RANGE: This community occurs in the Hat Creek and White River basins in Dawes, Sheridan, and Sioux counties in extreme northwestern Nebraska.

ECOREGIONS: 43g, 43h

ENVIRONMENTAL DESCRIPTION: This community occurs on level to gently rolling uplands. Soils are poorly drained silty clay and clay, and are formed in weathered siltstone and shale.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: Blue grama (*Bouteloua gracilis*), buffalograss (*Buchloë dactyloides*), western wheatgrass (*Elymus smithii*), green needlegrass (*Nassella viridula*)

DIAGNOSTIC SPECIES: *Artemisia tridentata*, *Bouteloua gracilis*, *Elymus smithii*

VEGETATION DESCRIPTION: This community is dominated by short and mid grasses < 1 m tall. Western wheatgrass is co-dominant with an underlayer of blue grama. In some places, curly bluegrass (*Poa secunda*) and buffalograss are locally common. Other graminoids found to a lesser extent include purple three-awn (*Aristida purpurea*), threadleaf sedge (*Carex filifolia*), green needlegrass, and needle-and-thread (*Hesperostipa comata*). There is some evidence to suggest that green needlegrass is a dominant in lightly grazed sites. Shrubs are uncommon, though in some places big sagebrush (*Artemisia tridentata*) is present. Typical forbs include wild onion (*Allium textile*), two-grooved milkvetch (*Astragalus bisulcatus*), Drummond's milkvetch (*Astragalus drummondii*), broom snakeweed (*Gutierrezia sarothrae*), bushy flax (*Linum compactum*), woolly plantain (*Plantago patagonica*), and scarlet globe mallow (*Sphaeralcea coccinea*). These sites are highly susceptible to invasion by exotic annuals and biennials, including Japanese brome (*Bromus japonicus*), fluffweed (*Logfia arvensis*), sweetclovers (*Melilotus* spp.), and yellow goat's-beard (*Tragopogon dubius*). Species diversity is low to moderate.

Clay pan prairie (Rolfsmeier, 1996) represents a subtype occurring as a mosaic with this community. Clay pans usually occur on gently sloping to nearly level ground on stream terraces and range in size from a few square meters to several hundred square meters. Most are sparsely vegetated with scattered grasses and forbs. The most conspicuous herbaceous species are <0.5 m tall, and include blue grama, buffalograss, slender plantain (*Plantago elongata*), poverty weed (*Monolepis nuttalliana*), spine-fruit prickly pear (*Opuntia polyacantha*) and lichens. Other forbs which may be locally abundant in the clay pans include yellow wild-parsley (*Lomatium foeniculaceum* var. *foeniculaceum*), leafy musineon (*Musineon divaricatum*), and branched false-goldenweed (*Oonopsis multicaulis*). Thickspike wheatgrass (*Elymus lanceolatus*) is the most frequent mid-grass, and is usually scattered in the clay pans. Shrubs are frequently present, but may be absent in areas. Big sagebrush (*Artemisia tridentata*) is most common, but is frequently absent. Shrubs that may replace it include silver sagebrush (*Artemisia cana*), fringed sage (*A. frigida*), rubber rabbitbrush (*Ericameria nauseosa* var. *glabrata*) and greasewood (*Sarcobatus vermiculatus*). The latter two are more common westward. Some clay pans are completely covered by short-grass prairie dominated by buffalograss.

Another possible subtype is present on hilltops with shallow soils overlying Pierre shale. It contains threadleaf sedge and sideoats grama (*Bouteloua curtipendula*) as co-dominants, in addition to western wheatgrass. *Yucca* (*Yucca glauca*) is often associated with these sites.

OTHER NOTEWORTHY SPECIES: Uncommon species found in this community include *Coryphantha missouriensis*, *Erigeron divergens*, *Eriogonum gordonii*, *Fritillaria atropurpurea*, *Lappula cenchrusoides*, *Mertensia lanceolata*, *Myosotis verna*, *Nuttallanthus texana*, and *Oenopsis multicaulis*.

STATE RANK: S3S4

RANK JUSTIFICATION: This community is fairly extensive in the northwestern portion of the State, but is commonly overgrazed and infested with cheatgrass (*Bromus japonicus*) and sweetclover (*Melilotus* spp.).

GLOBAL RANK: G4

COMMENTS: The description of this community is modified from Tolstead (1941) based on recent observations. Clay pan inclusions are treated by NatureServe as *Bouteloua gracilis* – *Buchloe dactyloides* Xeric Soil Herbaceous Vegetation. Some areas along the South Dakota border may need to be treated as a mosaic community with shale barrens, but more data are needed.

EXEMPLARY SITES: Toadstool Geologic Park in Sioux County

REFERENCES:

Rolfsmeier, S. B. 1996. A survey of the vegetation of clay pans and associated communities on the Oglala National Grasslands, Nebraska. Report to the Nebraska Game and Parks Commission: 21pp.

Tolstead, W. L. 1941. Plant communities and secondary succession in south-central South Dakota. *Ecology* 22:322–328.

WESTERN SANDY SLOPE PRAIRIE

ELEMENT NAME: CEGL001473

GLOBAL NAME: *Calamovilfa longifolia* – *Hesperostipa comata* Herbaceous Vegetation

OTHER NAMES: Colluvial sand prairie (Steinauer & Rolfsmeier, 1997)

RANGE: This community occurs mostly within the range of the western mixed-grass prairie community in the Panhandle, extreme north-central Nebraska, and possibly in southwest Nebraska.

ECOREGIONS: 25d, 25f, 25g, 43i

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes of various aspects that are associated with and below sandstone outcrops and escarpments. Soils are well-drained loamy sands formed in colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), needle-and-thread (*Hesperostipa comata*)

DIAGNOSTIC SPECIES: *Calamovilfa longifolia*, *Hesperostipa comata*

VEGETATION DESCRIPTION: This community is fairly densely vegetated by tall and mid-grasses, primarily prairie sandreed and needle-and-thread. An underlayer of blue grama may be present, but usually is not extensive. Western wheatgrass (*Elymus smithii*) may be prominent on more level sites at the base of slopes. On steeper slopes the vegetation is more open and often contains sand bluestem and forbs typical of sandsage prairie. Generally, needle-and-thread becomes more prominent on finer soils. Shrubs are scattered and infrequent to absent, with skunkbrush sumac (*Rhus aromatica*) the most common species. These areas are often highly susceptible to invasion by exotic bromes (*Bromus japonicus*, *B. squarrosus*, *B. tectorum*) and may be quite weedy. Species diversity is low to moderate (higher on steep slopes).

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3?

RANK JUSTIFICATION: This community is poorly studied; its range, extent, and condition in Nebraska is unknown. Invasion by weedy exotics is common in this community.

GLOBAL RANK:

COMMENTS: This community is usually found near and sometimes intergrades with Western Mixed-grass Prairie in the Panhandle. Tolstead (1942) observed that similar prairies in Cherry County are earlier successional stages of Western Mixed-grass Prairie. Continuing erosion of the escarpments associated with these grasslands may prevent succession from occurring. In the Wildcat Hills, this community sometimes intergrades with Sandsage Prairie, though the latter usually forms conspicuous dunes. Sandy slope prairie associated with pine woodlands in the Pine Ridge (and possibly also the Niobrara River valley) typically has big bluestem (*Andropogon gerardii*) and forbs typical of more eastern prairies and is recognized as a separate community.

EXEMPLARY SITES: Agate Fossil Beds National Monument in Sioux County.

REFERENCES:

Tolstead, W. L. 1942. Vegetation of the northern part of Cherry County, Nebraska. Ecological Monographs 12:257-292.

PINE RIDGE SANDY SLOPE PRAIRIE

ELEMENT NAME: C EGL001473

GLOBAL NAME: *Calamovilfa longifolia* – *Hesperostipa comata* Herbaceous Vegetation

OTHER NAMES: Colluvial sand prairie (Steinauer & Rolfsmeier, 1997)

RANGE: This community occurs in the Pine Ridge region in the Nebraska Panhandle, and may be associated with pine woodlands along the Niobrara River.

ECOREGION: 25a

ENVIRONMENTAL DESCRIPTION: This community occurs on gentle to steep slopes of various aspects that are below sandstone outcrops and escarpments. Soils are well-drained loamy sands formed in colluvium.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: big bluestem (*Andropogon gerardii*), sand bluestem (*Andropogon hallii*), prairie sandreed (*Calamovilfa longifolia*), sun sedge (*Carex heliophila*), needle-and-thread (*Hesperostipa comata*), Kentucky bluegrass (*POA PRATENSIS*), little bluestem (*Schizachyrium scoparium*).

DIAGNOSTIC SPECIES: *Andropogon gerardii*, *A. hallii*, *Carex heliophila*, *Panicum oligosanthos* var. *scribnerianum*, *Schizachyrium scoparium*.

VEGETATION DESCRIPTION: This community is fairly densely vegetated by tall and mid-grasses, primarily prairie sandreed and little bluestem. An underlayer of sun sedge may be present and locally extensive. On steeper slopes the vegetation is more open and often contains sand bluestem and forbs typical of Sandhills Dune Prairie. Occasional small pines (*Pinus ponderosa*) may be scattered in places. Shrubs are infrequent to absent. Many sites are heavily invaded by Kentucky bluegrass. Species diversity is moderate.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S3?

RANK JUSTIFICATION: This community is poorly studied; its range, extent, and condition in Nebraska is unknown.

GLOBAL RANK:

COMMENTS: This community is usually found near and sometimes intergrades with Western Mixed-grass Prairie, and may also grade into Coniferous Woodland. This grassland type was previously included as part of the Western Sandy Slope Prairie, but is more similar to Sandhills prairie types than to that community. Nonetheless it has been combined with Western Sandy Slope Prairie into the Prairie sandreed – Needle-and-thread Prairie by NatueServe. Much more study of this community type is needed .

EXEMPLARY SITES: Soldier Creek Wilderness Area in Sioux County.

REFERENCES:

NORTHERN SAND/GRAVEL PRAIRIE

ELEMENT CODE: CEGl002034

GLOBAL NAME: *Pascopyrum smithii* – *Stipa comata* Central Mixedgrass Herbaceous Vegetation

OTHER NAMES: Mixed prairie (Churchill, et al., 1988).

RANGE: This community is found on shoulders of upland bluffs above stream valleys in the Niobrara River drainage from Cherry County eastward to Knox County. It may also be present in Cedar County in northeast Nebraska.

ECOREGIONS: 42p, 44a

ENVIRONMENTAL DESCRIPTION: This community occurs on fairly level to gentle slopes atop bluffs. Soils are shallow and rapidly-drained sandy loams and sands often mixed with gravel.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: western ragweed (*Ambrosia psilostachya*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), needle-and-thread (*Hesperostipa comata*), hairy golden-aster (*Heterotheca villosa*), ledge spike-moss (*Selaginella rupestris*), sand dropseed (*Sporobolus cryptandrus*), stiff greenthread (*Thelesperma filifolium* var. *intermedium*)

DIAGNOSTIC SPECIES: *Artemisia frigida*, *Bouteloua gracilis*, *Selaginella rupestris*, *Talinum parviflorum*

VEGETATION DESCRIPTION: This community is dominated by a relatively sparse layer of tall grasses *ca.* 1 m tall, including needle-and-thread and prairie sandreed, and short grasses <0.5 m tall, with blue grama the primary species. Shrubs are not usually present, though subshrubs such as fringed sage (*Artemisia frigida*) and yucca (*Yucca glauca*) may be locally common. The sites observed during 1998 surveys also uniformly have a dense underlayer of the pteridophyte ledge spike-moss. Forbs are common, but most species are not abundant. The most common species include western ragweed, hairy golden-aster, and stiff greenthread. Species diversity is moderate to quite high.

OTHER NOTEWORTHY SPECIES: Information not available.

STATE RANK: S?

RANK JUSTIFICATION: The overall range and extent of this community in northern Nebraska is fairly poorly known.

GLOBAL RANK: G4

COMMENTS: This community is fairly narrowly defined here to include only gravelly sites on tablelands, in the Niobrara River valley.

EXEMPLARY SITES: The Niobrara Valley Preserve in Brown and Cherry Counties.

REFERENCES:

Churchill, S. P., C. C. Freeman, and G. E. Kantak. 1988. The vascular flora of the Niobrara Valley Preserve and adjacent areas in Nebraska. *Transactions of the Nebraska Academy of Sciences* 16:1-15.

WETLAND SPARSELY VEGETATED COMMUNITIES

SANDBAR/MUDFLAT

ELEMENT CODE: C EGL002049

GLOBAL NAME: Riverine Sand Flats-Bars Sparse Vegetation

OTHER NAMES: Annual mudflat (Currier, 1982)

RANGE: This community occurs within the channel of larger streams and rivers throughout the State.

ECOREGIONS: 25, 27, 42, 43, 44, 47

ENVIRONMENTAL DESCRIPTION: This community occurs within the channel of braided streams and rivers, which are subject to regular flooding. Sandbars are formed when receding

floodwaters deposit sand and lesser amounts of clay, silt, and cobbles in the streambed, and may rise up to one meter above the water surface. Soils are often undeveloped or poorly developed due to the ephemeral nature of sandbars and usually consist of sand, silt or gravel formed in alluvium. Drainage varies with soil texture and elevation above the water surface. Sandbars are usually first formed in June, and are highly vulnerable to undercutting and erosion throughout the year. Many sandbars survive only to the following Spring. This community also occurs on the banks of rivers and streams as water levels fall late in the season and during drought.

COWARDIN WETLAND SYSTEM: Riverine unconsolidated bottom, temporarily to seasonally flooded

MOST ABUNDANT SPECIES:

Herbaceous: beggarticks (*Bidens* spp.), flatsedges (*Cyperus* spp.), large barnyard grass (*ECHINOCHLOA CRUSGALLI*), teal lovegrass (*Eragrostis hypnoides*), Carolina lovegrass (*E. pectinacea*), bearded sprangletop (*Leptochloa fusca*), smartweeds (*Polygonum* spp.), Plains cottonwood (*Populus deltoides*) [seedlings], bog yellowcress (*Rorippa* spp.), willows (*Salix* spp.) [seedlings], sand dropseed (*Sporobolus cryptandrus*), cocklebur (*Xanthium strumarium*)

DIAGNOSTIC SPECIES: *Cyperus squarrosus*, *C. diandrus*, *C. erythrorhizos*, *Echinochloa crusgalli*, *Eragrostis pectinacea*, *Lipocarpha micrantha*

VEGETATION DESCRIPTION: The vegetation is highly variable due to the ephemeral, successional nature of the community. Recently exposed sandbars are initially devoid of vegetation, but are soon colonized by opportunistic annual forbs and graminoids, usually under 0.5 m tall. Lower areas adjacent to the river channel are dominated by hydrophytic species, while higher areas of the sandbar are dominated by plants tolerant of the drier conditions present on more rapidly drained soils. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species known from this community include *Fimbristylis autumnalis*, *Leucospora multifida*, *Myosotis laxa*, *Rotala ramosior*, and *Triglochin palustris*.

STATE RANK: S5

RANK JUSTIFICATION: This community is still fairly common along the Platte and Loup and unchannelized portions of the Elkhorn and Missouri rivers and larger tributaries. In some areas this community has been impacted by channelization (especially along the Missouri River) and reduced stream flows and subsequent encroachment of woody vegetation (such as along the Platte River).

GLOBAL RANK: G4G5

COMMENTS: This community is rather short-lived and rarely persists more than a single season before it is either destroyed by flooding or succeeds to secondary communities such as willow sandbar or wet meadow. Certain sites may have over 25% herbaceous cover in given

years, but the overall vegetative cover is visibly sparser than in other wetland communities in the state.

EXEMPLARY SITES: The lower Platte River in eastern Nebraska.

REFERENCES:

Currier, P. J. 1982. The floodplain vegetation of the Platte River: Phytosociology, forest development, and seedling establishment. Ph.D. dissertation, Iowa State University, Ames, Iowa: 317pp.

Hanson, H. C. 1918. The invasion of a Missouri River alluvial flood plain. *The American Midland Naturalist* 5:196–201.

Morrison, J. L. 1935. The development and structure of the vegetation on the sandbars and islands in the lower Platte River. M. A. thesis, University of Nebraska, Lincoln, Nebraska: 72 pp.

UPLAND SPARSELY VEGETATED COMMUNITIES

WESTERN GRAVEL FLATS

ELEMENT CODE: C EGL005223

GLOBAL NAME: Riverine Gravel Flats Great Plains Sparse Vegetation

OTHER NAMES: Riverine Gravel Flats

RANGE: This community occurs along the Platte rivers from Dawson County westward, but is most extensive in the drainage of the South Platte in Deuel and Keith counties.

ECOREGIONS: 25f, 25h, 27d

ENVIRONMENTAL DESCRIPTION: This community occurs as patches or bands on level ground usually on the first terrace of rivers or in level canyon bottoms. Soils are poorly developed or absent, rapidly drained, and consist of gravel and cobbles with lesser amounts of sand, formed in alluvium. Depth to the water table varies, but these sites may be subject to periodic brief flooding after rains, but are so rapidly drained that hydrophytic species cannot become established.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: purple three-awn (*Aristida purpurea*), common ragweed (*Ambrosia artemisiifolia*), western sagewort (*Artemisia campestris* var. *caudata*), blue grama (*Bouteloua gracilis*), spurges (*Euphorbia glyptosperma*, *E. serpyllifolia*), slender snake cotton (*Froelichia gracilis*), Plains sunflower (*Helianthus petiolaris*), golden-asters (*Heterotheca* spp.), Plains prickly pear (*Opuntia tortispina*), slender knotweed (*Polygonum ramosissimum*), sand dropseed (*Sporobolus cryptandrus*), purple sandgrass (*Triplasis purpurea*)

DIAGNOSTIC SPECIES: *Artemisia campestris* var. *caudata*, *Euphorbia serpyllifolia*, *Pectis angustifolia*, *Sporobolus cryptandrus*

VEGETATION DESCRIPTION: The vegetation of this community is relatively sparse and often consists of nearly equal cover of tufted annual and perennial grasses and annual or biennial forbs under 1 m tall. Sand dropseed is usually the most common grass, though blue grama is sometimes frequent. In canyon bottoms, patches of taller grasses typical of adjacent slopes, such as prairie sandreed (*Calamovilfa longifolia*) and sand bluestem (*Andropogon hallii*) may be conspicuous. Annual and perennial forbs are common and conspicuous, the most frequent being sand-lily (*Mentzelia nuda*), golden-asters, common ragweed (*Ambrosia artemisiifolia*), lemon pectis, and western sagewort. Common invasive exotics include slender Russian thistle (*Salsola collina*) and cheatgrasses (*Bromus* spp.) In some sites along the Platte River, cottonwoods (*Populus deltoides*) may be scattered, and in some places may be sufficiently dense to classify the community as an open woodland. Shrubs are scattered and uncommon, with false indigobush (*Amorpha fruticosa*) the most frequently encountered in riverine sites. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Large-spike prairie-clover (*Dalea cylindriceps*) has been found in this community in Lincoln County.

STATE RANK: S3?

RANK JUSTIFICATION: The full extent of this community in Nebraska is not known. Reduced river flows and decreased frequency of flooding may cause some riverine sites to succeed to woodland. Some sites along the Platte have been invaded by salt-cedar (*Tamarix ramosissima*). Heavy grazing pressure in canyon bottoms may degrade some sites.

GLOBAL RANK: G?

COMMENTS: Previously, this community was arbitrarily defined to include gravel flats associated with large rivers. It now includes gravel draws in canyon bottoms associated with lower Lodgepole Creek and the western Platte River that are similarly subject to periodic flooding and have similar species composition. Non-floodplain sites were previously included in the Southern Sand/Gravel Prairie based on minor floristic similarities.

Some low, rolling hills along the margin of river valleys in Dix soils may be completely covered with gravel and cobbles and have similar vegetation and might be included here. The full extent of these sites is unknown.

EXEMPLARY SITES: Extensive examples of riverine gravel flats are on the south side of the North Platte River near the Sutherland Canal Diversion Dam in Keith County. An example of the canyon bottom type is found on the south end of Ash Hollow State Historical Park.

REFERENCES:

Sutherland, D. M., and S. B. Rolfsmeier. 1989. The vascular plants of Keith County, Nebraska. Transactions of the Nebraska Academy of Sciences 17:83–101.

DRY CLIFF

ELEMENT CODE: C EGL005257

GLOBAL NAME: Sandstone Great Plains Dry Cliff Sparse Vegetation

OTHER NAMES:

RANGE: This community is found on escarpments in the Panhandle.

ECOREGIONS: 25

ENVIRONMENTAL DESCRIPTION: This community occurs on steep (60% or greater) slopes of sandstone or siltstone escarpments. Cliffs may be over 100 m high. Soils are not developed.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Herbaceous: ten-petal blazing-star (*Mentzelia decapetala*), smooth beardtongue (*Penstemon glaber*).

DIAGNOSTIC SPECIES: *Mentzelia decapetala*, *Penstemon glaber*

VEGETATION DESCRIPTION: Vegetation in this community is extremely sparse, and many sites are unvegetated. Plants occurring in this community are scattered forbs, which often do not flower. Other species typical of rock outcrops may be present on narrow ledges. Species diversity is extremely low.

OTHER NOTEWORTHY SPECIES: Information not available

STATE RANK: S5

RANK JUSTIFICATION: Although the range and extent of this community is limited, it has been impacted little by disturbance.

GLOBAL RANK:

COMMENTS: NatureServe recognizes Niobrara chalk outcrops in Knox and Cedar County in northeast Nebraska as Limestone – Dolostone Great Plains Xeric Cliff Sparse Vegetation. We cannot yet separate the two on the basis of vegetation. These sites are commonly utilized by nesting raptors.

EXEMPLARY SITES: Scotts Bluff National Monument in Scotts Bluff County.

REFERENCES:

The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.

ROCK OUTCROP

ELEMENT CODE: CEGL002047

GLOBAL NAME: Siltstone - Sandstone Rock Outcrop Sparse Vegetation

OTHER NAMES:

RANGE: This community is found on escarpments mostly in the Panhandle and southwest Nebraska.

ECOREGIONS: 25a, 25c, 25d, 25f

ENVIRONMENTAL DESCRIPTION: This community occurs on nearly level to moderately steep (40% grade) upper and middle slopes on irregularly eroded sandstone and siltstone escarpments or ravines, but may also be present on ridgetops. Soils are poorly developed to absent, and consists of very shallow sandy loams or silty loams.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: skunkbrush sumac (*Rhus aromatica*)

Herbaceous: Hooker's sandwort (*Arenaria hookeri*), standing milkvetch (*Astragalus laxmannii* var. *robustior*), tufted milkvetch (*A. spatulatus*), sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), Mountain cat's-eye (*Cryptantha cana*), thickspike wheatgrass (*Elymus lanceolatus*), few-flower wild buckwheat (*Eriogonum pauciflorum* var. *gnaphodes*), broom snakeweed (*Gutierrezia sarothrae*), ten-petal blazing-star (*Mentzelia decapetala*), rock muhly (*Muhlenbergia cuspidata*), sand muhly (*M. pungens*), James' nailwort (*Paronychia jamesii* var. *depressa*), Hood's phlox (*Phlox hoodii*), lemon scurfpea (*Psoralidium lanceolatum*), stemless tetraeneuris (*Tetraeneuris acaulis*)

DIAGNOSTIC SPECIES: *Arenaria hookeri*, *Astragalus spatulatus*, *Cryptantha cana*, *Ericameria parryi* var. *howardii*, *Linanthus caespitosus*, *Paronychia jamesii* var. *depressa*, *P. sessiliflora*, *Penstemon eriantherus*, *P. glaber*, *Phlox hoodii*, *Stephanomeria runcinata*, *Tetraneuris acaulis*

VEGETATION DESCRIPTION: This community is sparsely to moderately vegetated by a mixture of short shrubs (<1 m tall), mid and short grasses, and forbs. The shrub component frequently consists of widely scattered individuals of skunkbrush sumac, though Parry's rabbitbrush (*Ericameria parryi* var. *howardii*) is common in the Wildcat Hills and mountain mahogany (*Cercocarpus montanus*) is present in some sites. Forbs are usually more abundant than grasses in sites with little or no soil development. Hooker's sandwort, few-flower wild buckwheat, and Hood's phlox are among the most abundant. Where a shallow layer of soil has developed, grasses are more abundant than forbs, with blue grama and thickspike wheatgrass among the more common species. Inclusions of Western Mixed-grass Prairie may be present in this community where the soil is slightly deeper. Species diversity in this community varies from relatively low to relatively high.

OTHER NOTEWORTHY SPECIES: Uncommon species found in this community include *Astragalus hyalinus*, *Ericameria parryi* var. *howardii*, *Erigeron ochroleucus* var. *scribneri*, *Eriogonum brevicaulis*, *E. cernuum*, *Fritillaria atropurpurea*, *Ipomopsis spicata*, *Linanthus caespitosus*, *Linum puberulum*, *Lomatium nuttallii*, *Oxytropis multiceps*, *Paronychia sessiliflora*, *Phacelia hastata*, *Physaria brassicoides*, *Potentillia hippiana* ssp. *effusa*, *Stenotus armerioides*, and *Stephanomeria runcinata*.

STATE RANK: S4

RANK JUSTIFICATION: Though the range and extent of this community is limited, it has been little impacted by disturbance.

GLOBAL RANK: G?

COMMENTS: The global name assigned to this community type is questionable. Small outcrops of this community type may be regarded as inclusions within the Western Mixed-grass Prairie community. Rock outcrop communities in southwestern Nebraska are similar in character but have different species composition. These are fairly limited in size and poorly studied, and are currently treated as inclusions within grassland community types. Rock outcrop communities in the far northwestern part of the State may deserve separate recognition.

EXEMPLARY SITES: Mitchell Pass at Scotts Bluff National Monument in Scotts Bluff County.

REFERENCES:

Rolfsmeier, S. B. 1996. Wildcat Hills rare plant survey final report. Report to the Nebraska Game & Parks Commission, Lincoln: 24pp.

The Nature Conservancy, 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program: 59pp.

BADLANDS

ELEMENT CODE: CEGLO02050

GLOBAL NAME: Eroding Great Plains Badlands Sparse Vegetation

OTHER NAMES: Eroding Great Plains Badlands

RANGE: This community occurs in Dawes, Scotts Bluff, and Sioux counties in the Panhandle.

ECOREGIONS: 43g, 43h

ENVIRONMENTAL DESCRIPTION: This community is found on moderate to steep, highly erodible slopes of siltstone, clay, or clay with cobbles. There is little to no soil development. Most sites are bordered by level, mixed-grass prairie.

COWARDIN WETLAND SYSTEM: Upland

MOST ABUNDANT SPECIES:

Shrub: silver sagebrush (*Artemisia cana*), saltbush (*Atriplex canescens*), rubber rabbitbrush (*Ericameria nauseosa*)

Herbaceous: silver orache (*Atriplex argentea*), thickspike wheatgrass (*Elymus lanceolatus*), few-flower wild-buckwheat (*Eriogonum pauciflorum* var. *pauciflorum*), poverty weed (*Monolepis nuttalliana*), Russian thistle (*SALSOLA* spp.)

DIAGNOSTIC SPECIES: *Astragalus tenellus*, *Atriplex canescens*, *Ericameria nauseosa*, *Eriogonum pauciflorum* var. *pauciflorum*

VEGETATION DESCRIPTION: This community is mostly unvegetated, though locally, vegetative cover may be sparse to moderate. The dominant vegetation of badland slopes mostly consists of scattered shrubs 0.5 m tall. The most common shrubs are saltbush and rubber rabbitbrush, and in a few sites, greasewood (*Sarcobatus vermiculatus*) is present. Herbaceous species are scattered to locally common, and often consist of annual Chenopodiaceae such as silver orache, poverty weed, and Russian thistle. The vegetation of level badland washes found below the steep, highly erodible slopes is frequently denser and more diverse. Grasses typical of Northwestern Mixed-grass Prairie, such as thickspike wheatgrass, western wheatgrass (*Elymus smithii*) and curly bluegrass (*Poa secunda*) may be frequent. Patches of silver sagebrush may also be common. Forb species that are conspicuous in badland washes include poison milkvetch (*Astragalus racemosus* var. *longisetus*), pulse milkvetch (*A. tenellus*), buttecandle (*Cryptantha*

celosioides), few-flower wild buckwheat, and silky locoweed (*Oxytropis sericea*). The potentially invasive saltlover (*Halogeton glomeratus*) has invaded a few sites and could potentially become abundant in this community. Species diversity is low to moderate.

OTHER NOTEWORTHY SPECIES: Uncommon species present in this community include *Lappula cenchrusoides*, *Fritillaria atropurpurea*, *Lesquerella arenosa* var. *argillosa*, and *Oenopsis multicaulis*.

STATE RANK: S3

RANK JUSTIFICATION: This community type has a limited range and extent in the State, but is not heavily impacted by agricultural practices, including cattle grazing. Invasion of badland washes by exotic species is a potential threat.

GLOBAL RANK: G4G5

COMMENTS: The description of this community for Nebraska is more inclusive than that designated by the global name, which refers only to the nearly unvegetated badland slopes.

EXEMPLARY SITES: Toadstool Geologic Park in the Oglala National Grasslands in Sioux County.

REFERENCES:

Hardy, J. and R. R. Weedon. 1995. Oglala National Grasslands badlands vegetation survey, May-August 1995. Interim report to the Nebraska Game & Parks Commission, Lincoln: 17pp.

The Nature Conservancy. 1995. Vegetation Classification of Scotts Bluff National Monument. Report to the National Biological Survey Vegetation Mapping Program. 59pp.