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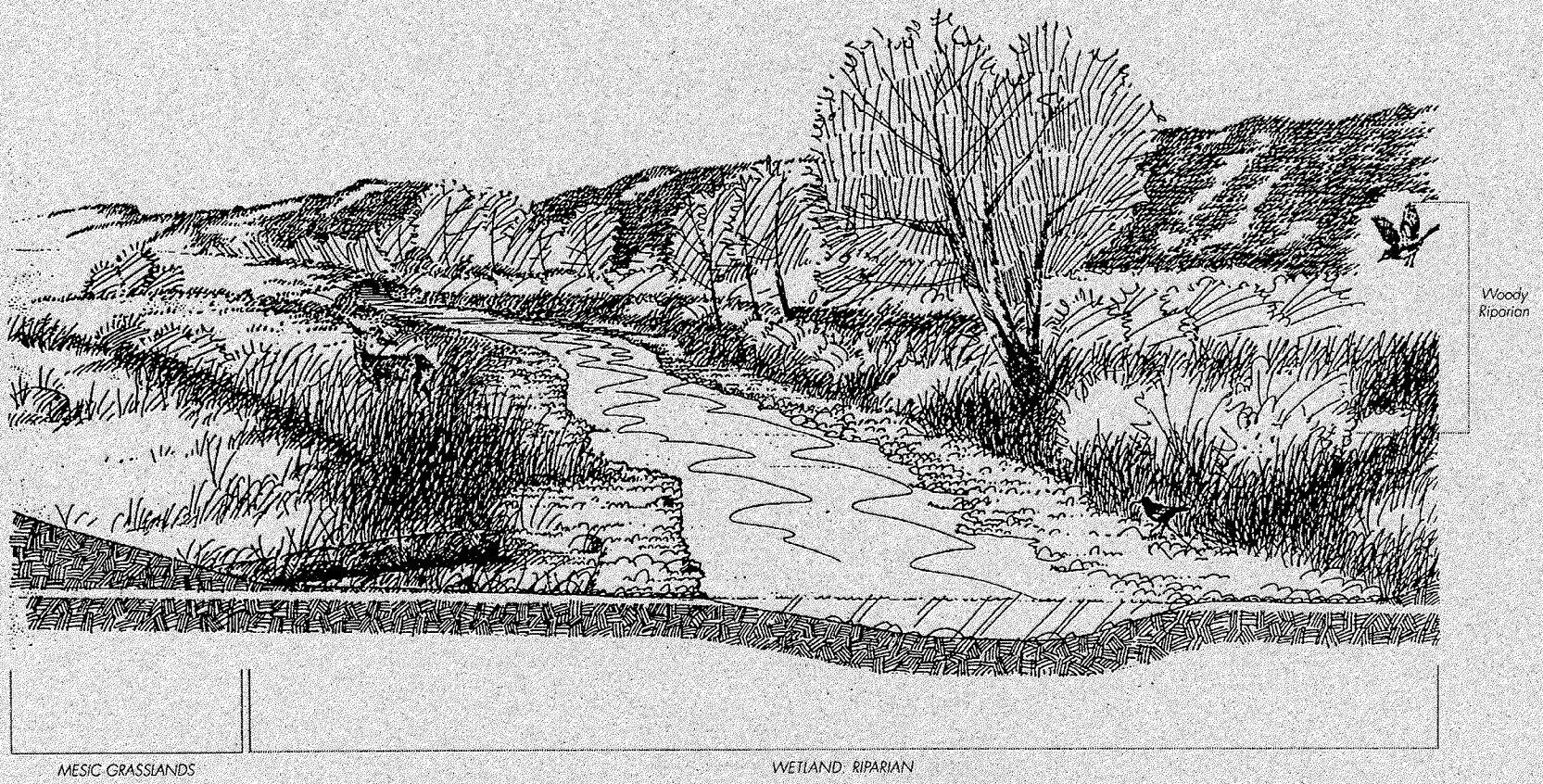
City of Boulder

Wetlands Protection Program Best Management Practices: Revegetation Rules



Prepared by ERO Resources Corporation
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City of Boulder Wetlands Protection Program Revegetation Rules

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Hitchcock, A. 1971. Manual of the Grasses of the United States. Dover.

Britton, N. and Brown, A. 1970. An Illustrated Flora of the Northern United States and Canada. Dover.

Lackschewetz, K. 1991. Vascular Plants of West-Central Montana — Identification Guidebook. U.S. Forest Service.

Wasser, C. 1982. Ecology and Culture of Selected Species Useful in Revegetating Disturbed Lands in the West. U.S. Fish and Wildlife Service.

Table of Contents

Introduction

Use and Application

The City of Boulder Best Management Practices: Revegetation Rules provides a regulatory framework for applicant to use in evaluating their sites and restoring wetland, riparian, and adjacent habitats when avoidance is not possible. The rules outline considerations in designing and implementing a wetland revegetation project.

The rules set forth in this document apply to all wetland regulated areas, including all wetlands mapped within Boulder's city limits as well as all wetlands on city-owned lands, and all city activities affecting wetlands regardless of location. Maps showing the regulatory boundaries of wetlands within the city are available from the Mapping and Records Office in the Department of Public Works.

The rules set forth in this document are to be used in conjunction with the City of Boulder Wetlands Protection Program Best Management Practices (BMP's) and other city documents included in the list to the right. The first volume of BMP's was adopted by the city manager as a rule in July 1995. BMP's are required in order to proceed pursuant to Section 9-12-5(c) and (d), B.R.C. 1981. In addition, BMP's may be utilized pursuant to other sections of the ordinance including conditions in wetland permits, Section 9-12-9, B.R.C. 1981, or as part of a mitigation plan, Section 9-12-10, B.R.C. 1981.

Revegetating with Natives

These rules focus on the establishment of native wetland, riparian and upland vegetation. Restoration and revegetation may occur in the wetland, surrounding buffer, or both; hence; the rules address a range of habitats.

In its Application Materials for Compensatory Mitigation Plans, the city specifies that native plant materials from local sources will be used for wetland mitigation and revegetation. The rules focus on plant materials native to the Boulder region. Although some of the native plant materials presented currently are not commercially available, nurseries may carry them in the future. Natives are more desirable than non-natives because native plants typically require little long-term maintenance and are adapted to local conditions. Native plants are more beneficial to wildlife than non-native species because the native animals are adapted to local vegetation. Additionally, many non-native species become nuisances that are difficult to control and, as they spread, they replace desirable native species. These rules also emphasize the use of commercially available native plant materials for revegetation because commercially available stock is easier to specify in contract documents.

The Boulder Revegetation Rules focus more specifically on the restoration and revegetation of wetlands and adjacent areas disturbed by construction activities, than the creation of new wetland habitats. However, plant materials and methods described in the rules have applicability to the creation of new wetland habitats as well.

The efficiency and potential for success in using means other than commercially available seeds

- Advanced Identification of Wetlands in the City of Boulder Comprehensive Planning Area
- City of Boulder Wetlands Mitigation Guidelines and Wetlands Mitigation Design Standards and Specifications
- City of Boulder Wetlands Protection Program Best Management Practices. Management techniques that must be integrated with revegetation plans to successfully establish vegetation are outlined as follows:

Seedbed preparation	p. 63
Seeding	p. 65
Mulching	p. 66
Bank stabilization	pp. 43-60
Erosion control	pp. 16-18, 75-86

- City of Boulder Wetlands Protection Ordinance Guidance for Applicants
- Application Materials for Compensatory Mitigation Plans
- Plan Requirements for Wetlands Permits (Attachment L)
- Wetlands Permit Criteria (Attachment K)
- City of Boulder Wetlands Ordinance No. 5521, which regulates activities that occur in a wetland and its buffer area (typically 25 feet to 50 feet surrounding the wetland), collectively referred to as the regulated area.

and plants for establishing native vegetation should be considered on a project-specific basis. In open space and areas of relatively undisturbed native vegetation, alternative methods can be highly successful in establishing native vegetation. Because of this, city policies emphasize using local seed sources for Open Space projects. Alternative methods include—

- Using topsoil salvaged from a similar habitat prior to site development;
- Harvesting and using seeds from local native species that cannot be acquired from local commercial sources;
- Using "donor sites" for transplanting rhizomes, tubers, and plugs of native plants; and
- Salvaging and transporting native sod.

Important Considerations for a Successful Revegetation Project

These rules will assist in designing a revegetation plan; however, in order to establish a successful, sustainable plant community three criteria must be considered carefully—

1. **Time** — Native vegetation can take longer to grow than some introduced species. After native plants have become established, they are more hardy under local conditions than introduced plants. However, native plants may take years to mature and can leave large areas of bare soil susceptible to invasion of weeds. If aggressive weeds are controlled, and site conditions can support the selected species, then vegetation will establish, mature, and spread.
2. **Flexibility** — Unanticipated problems may occur in revegetation projects. The site may be drier or wetter than anticipated, and new plantings can be killed during restoration, washed out by large flood events, or decimated by wildlife. Some of these problems can be avoided by planting and seeding a diversity of plants that grow under a wide range of conditions. Then, for example, if the site is too wet for one species, another species more tolerant of wetter conditions will become established.

3. **Management** — For a revegetation project to be successful, it cannot be planted and then abandoned. Weed and erosion control, watering, remedial planting, and pedestrian access need to be addressed for two to five growing seasons, depending on the potential for revegetation and restoration success. Criteria for determining the success of a revegetation project should be included in the revegetation plans. A wetland may be determined successful if wetland vegetation (wetland indicator rating of FAC or better) and hydrology are found to be stable. One standard used for quanifying success is for 75 percent of the area to be covered by species with a wetland rating of Facultative or wetter. A revegetation project may be determined successful if 80 percent of the trees and shrubs planted survive for three growing season.

   City of Boulder wetland regulations, however, specify that a permit applicant may be responsible for the implementation of a wetland mitigation plan for up to five years from the time of construction in order to insure success of the project.

Designing and Implementing a Revegetation Project

The following steps will assist you in successfully designing and maintaining a native plant landscape:

Step 1 — Site Characterizations: Before construction is started, conduct a site analysis to determine the water, landscape, soils, and other important characteristics. Plant species have varying requirements and tolerances relative to soil moisture, flooding, light, soil texture, and salinity. Answer the questions in Table 1 to help you analyze your site.

Step 2 — Set Goals: After the site conditions and habitat types are known, determine the project goals. These may include:

- Returning a wetland and its associated buffer zone to the same functional value as before the disturbance. (This is a requirement of the city of Boulder Wetland Permit Process.) Functional Values are ratings assigned to the beneficial roles served by the wetlands (and to a more limited extent, their associated buffer zones). These functions include (but are not limited to) storage of floodwater, ground water recharge and discharge, protection of water quality by sediment trapping and shoreline anchoring, habitat for plants and animals. For most wetlands in the city of Boulder, these functional values have already been determined and the information is available in the Department of Public Works.
- Open Space Goals: If this project is within or adjacent to an Open Space Area, then the requirements of that particular area needs to be considered in the plan.
- Aesthetic Goals: For example, when revegetating a buffer zone next to a bike path, the goal may be to plant trees and shrubs that will provide shade and beauty along the path.
- Practical Goals: The project, for example, may include revegetating the upper banks of an urban drainage. In the past, this site may have been mowed for safety reasons and would continue to be mowed in the future. The goal for this project may be to plant grasses that can withstand frequent mowing.

Table 1: Questions to Analyze the Site

- Regulatory Division: Is the site in the Buffer Zone, Wetland Zone, or both?
- Hydrology: Is the site along a stream? Is streamflow permanent or intermittent? Is the site hydrology understood? If so, how far below ground level is the water table? Does the water table level fluctuate seasonally, and if so by how much?
- Topography: Is the site a depression with gentle side slopes, a steep, incised stream channel, a shallow stream channel, or a combination of several different types?
- Soils: What is the soil's texture (clayey, loam, sandy)? Is the soil alkaline or saline?
- Vegetation: What kind of vegetation currently exists on the site — trees, shrubs, only herbaceous vegetation? What are the species? Are these native or introduced?
- Elevational Zone: Is the site along the foothills or on the plains? (In the Boulder area, foothills begin at the base of mountains around 5,600'; plains extend from the bottom of foothills below about 5,600'.)
- Management Concerns: Are there existing or potential problems that need to be addressed in the design of the plan (e.g., weeds, erosion, heavy pedestrian traffic)?
- Future Conditions: How will site conditions change? Will development in the next 10 years add more stormwater runoff and drainage?

• **Step 3 — Design Layout Using Habitat Types:** After the conditions of the site (Step 1) and the goals (Step 2) have been determined, this information can be used to begin designing the revegetation plan based on what will grow best under these particular conditions. In most cases, wetland revegetation plans must also seek to replace or restore pre-existing wetland conditions. To assist with the revegetation design, these Rules divide the city of Boulder Regulated Areas (Wetland and Buffer Zones) into six major habitat types[1].

These habitat types are a coarse grouping of the major plant communities[2] in the city of Boulder's Wetland and Riparian Zone. For example, the Wetland: Riparian habitat type generally occurs in wet soils next to streams. Table 2 shows the habitat types and conditions (Regulatory Division, hydrology, topography, and soils) that make up these types. Each habitat type is described in greater detail in Section 1 and includes detailed information on water requirements, soils, topography, plant species, and management concerns.

The six habitat types are designed to be used as landscape building blocks. One or more habitat types may be used on a project depending on the particular conditions at a site. Illustrations throughout the document show how the different habitat types may fit together. For example, the illustration on page 42 shows a Wetland: Riparian habitat at the bottom of the drainage with the upper slopes covered by Buffer: Woody Riparian on the cooler north-facing slopes, and Buffer: Xeric (Dry)Grasslands on the hotter south-facing slopes. In addition, each habitat description in Section 1 includes a section on Associated Habitats, which depicts how different habitat types fit together depending on the particular site conditions.

Step 4 — Plant Selection: After the appropriate habitat type(s) have been determined, different plant species can be selected from species that grow best under these conditions.

Each habitat type in Section 1 has several lists of plants to assist the designer with selecting the appropriate species.

- Native Plant Palette — This is a comprehensive list of native species[3] recommended for revegetating the particular habitat type. Other native species not on the list can be used in these revegetation projects; however, care must be taken to ensure that the species are native to the Boulder Region, the plant or seed source is local, and it is appropriate for the particular habitat type. (See Additional Recommended Species for a list of other plants that can be used in the Boulder area.)
- For further help in selecting native plants for the project, each habitat type includes a list of highly recommended natives. These species have desirable qualities that are key for rapid and successful habitat establishment. Use these species in the appropriate locations along with a mixture of other desired species.
- For most of the habitat types, a general seed mix for use under a wide variety of conditions is included. These seed mixes are adequate for most sites within a habitat type. Many sites, however, have specific conditions requiring a customized planting plan using the species from the recommended plant list. For more site-specific seed mixes, contact the Boulder County Natural Resources Conservation Services in Longmont or a professional plant ecologist.

For more specific information on each plant, Section

[1] *The six habitat types are adapted from Advanced Identification of Wetlands in the City of Boulder Comprehensive Planning Area (Cooper 1988).*

[2] *These major plant communities can be divided further into more distinct plant communities that depend on specific local conditions. More information on these communities can be found in Advanced Identification of Wetlands in the City of Boulder ComprehensivePlanning Area (Cooper 1988).*

Table 2. Use the site analysis information to determine the appropriate habitat type or types for the site as follows:

Regulatory division + Hydrology + Topography + Soils = Habitat type

Regulatory Division	Hydrology	Topography	Soils	Habitat Type
Wetland	Adjacent to running water, either intermittent or permanent. The soils are saturated for at least a portion of the year.	At the bottom of the drainage.	Varied	**Wetland: Riparian**
Wetland	The water table is within 1 foot of the surface for a portion of the growing season.	Depressions. Along the margins of ponds	Varied, includes saline and alkaline flats	**Wetland: High Water Table**
Wetland	Standing water varying from a few inches to 3 feet	Ponds, Reservoirs	Varied, includes saline and alkaline flats	**Wetland: Permanent Standing Water**
Buffer Zone	Adjacent to running water, either intermittent or permanent. Soils not saturated for a portion of the growing season.	Upper banks of drainages	Varied	**Buffer Zone: Woody Riparian**
Buffer Zone	Moist soils that are not saturated for a portion of the growing season.	Upper banks of drainages. Upland areas. Shallow swales without saturated soils.	Deep loams that range in texture from cobbly to claycy	**Buffer Zone: Mesic Grasslands**
Buffer Zone	Dry, with well-drained soils	Upland	Varied, from sandy to claycy loams	**Buffer Zone: Xeric Grasslands**

[3]*Note on scientific names - The scientific names of many of these species currently are being revised. In order to make this document easy to use, the more commonly printed scientific name is printed first, with the revised scientific name (Weber and Wittman 1996) in parenthesis.*

(Wetland Riparian)

(Buffer Zone: Woody Riparian)

II Plant Encyclopedia provides a detailed description of each species to assist in determining which species would be appropriate for a specific site. This information includes the plant's soil, water, and other requirements, suggested landscape use, management concerns, and description of its habitat.

Also included is a symbol referencing the habitat type or types where it occurs. For example, plains cottonwoods can be planted in Wetland: Riparian and Buffer Zone: Woody Riparian habitat types. This symbol allows the reader to quickly identify species from the different habitat types and to cross reference to the habitat information in Section I.

Step 5 — Construction: Following the proper construction techniques is critical for successfully revegetating a disturbed sites. The City of Boulder Wetlands Protection Program Best Management Practices (BMPs) contain important general information on the required soil preparation, planting/seeding, and mulching techniques. For more specific information on a particular habitat, read the Management Concerns described in each habitat type in Section I. Each species in the Section II Plant Encyclopedia also includes specific planting and other information under Management Concerns.

Step 6 — Maintenance: For a successful revegetation project, long-term maintenance schedules and concerns needs to be addressed in the revegetation plans. Of special concern is weed control because all revegetation sites are disturbed and susceptible to colonization by weedy species that compete with desirable native vegetation. Each habitat type in Section I lists the most troublesome weeds associated with the habitat. For more information on how to control a particular weed, contact the Colorado State University Extension Office in Longmont at 776-4865..

Habitat Descriptions

WETLAND: PERMANENT STANDING WATER

WETLAND: HIGH WATER TABLE

Habitat Descriptions

Wetland: Riparian

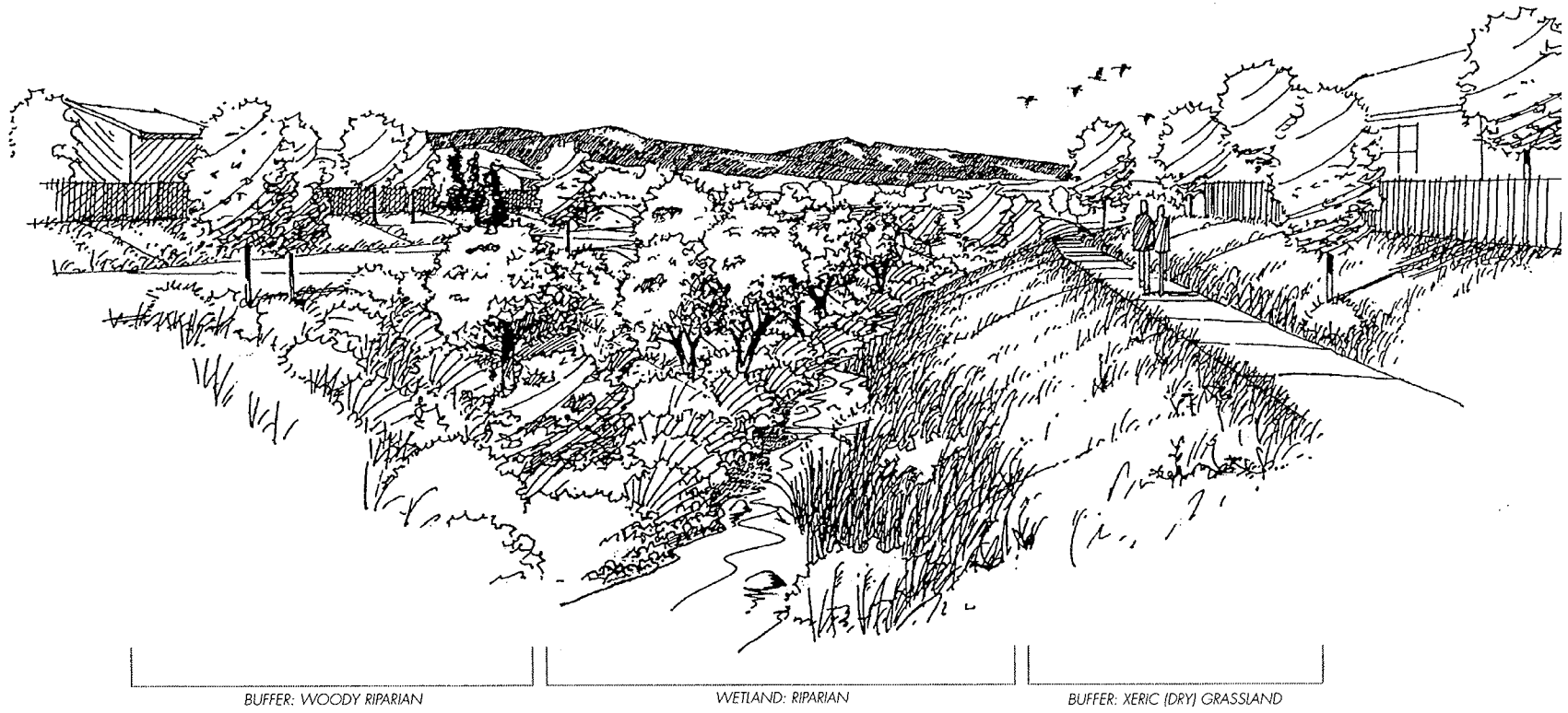
Wetland: High Water Table

Wetland: Permanent Standing Water

Buffer Zone: Woody Riparian

Buffer Zone: Mesic Grassland

Buffer Zone: Xeric (dry) Grassland


BUFFER: WOODY RIPARIAN
WETLAND: RIPARIAN
BUFFER: XERIC (DRY) GRASSLAND

Wetland: Riparian

Description

Several intermittent or perennial streams flow through the City of Boulder. Flows and stream stage fluctuate widely during the year from several feet above the streambed during spring and after thunderstorms to a small trickle or even no water in the fall and winter. Some of the bigger streams, such as Boulder Creek, have a relatively large flow of water year-round.

The Wetland Riparian habitat occurs in the bottoms of drainages adjacent to streams. Along shallower stream valleys, especially on the eastern plains, wide swatches of sandbar willows grow within the flood plain. These plants grow well in low-lying areas next to the streams because they can tolerate periodic inundation by high velocity flood waters. In narrower shady channels, a dense shrub layer of willows, currants, and others grow under a canopy of cottonwoods, alders and other trees.

In more open areas, tall grasses such as switchgrass and prairie cordgrass dominate streambanks. These rhizomatous grasses create thick sods that anchor the creeks.

In general, vegetation in the riparian areas differ between the canyons of the foothills and the streams of the plains. The cooler, moister foothills are shrubbier — containing a greater diversity of shrubs and small trees that do not occur on the plains. On the plains, the streams typically contain patches of grasses between wide swaths of sandbar willows and other shrubs with scattered patches of cottonwoods (see front cover).

Historically, Colorado streams meandered across the landscape, changing course over time. Today, this natural meandering may still occur in rural areas; however, in urban as well as some rural areas, streams have been channelized, creating straight, steep-sided streambeds (see page facing the introduction).

Cottonwoods, willows, and a wide variety of shrubs and herbaceous species grow in wetlands along naturally meandering streams. In channelized streams, wetlands tend to be narrower because of the straight banks. Native trees such as cottonwoods do not generally regenerate in straight channels.

Habitat Association

The Wetland: Riparian habitat forms the lower banks of permanent and intermittent drainages. On the banks above these wetlands, communities of Buffer Zone: Woody Riparian, Buffer Zone: Mesic Grassland, and Buffer Zone: Xeric Grassland can occur.

Wetland: Riparian Habitat Native Plant Palette

Common Name	Scientific Name	Zone[1]
Trees		
Box Elder	*Acer negundo (Negundo aceroides ssp. interius)*	P, F
Cottonwood, Lanceleaf	*Populus x acuminata* (hybrid)	P, F
Cottonwood, Narrowleaf	*Populus angustifolia*	F
Cottonwood, Plains	*Populus deltoides (sargentii)*	P, F
Willow, Peachleaf	*Salix amygdaloides*	P, F
Shrubs		
Alder	*Alnus tenuifolia (incana* ssp. *tenuifolia)*	F
Birch, River	*Betula fontinalis*	F
Currant, Common or Whitestem	*Ribes inerme*	F
Currant, Golden	*Ribes aureum*	P, F
Dogwood, Red osier	*Cornus stolonifera (Swida sericea)*	F
Leadplant, Indigobush	*Amorpha fruiticosa*	P, F
Maple, Rocky Mountain	*Acer glabrum*	F
Twinberry or Bush Honeysuckle	*Lonicera (Distegia) involucrata*	F
Willow, Sandbar	*Salix exigua*	P, F
Vines		
Virginsbower, Western	*Clematis ligusticifolia*	P, F
Grape, River	*Vitis riparia*	F

[1]P = Plains; F = Foothills

Wetland: Riparian Habitat Native Plant Palette, continued

Grasses/Grass-like		
Alkali Sacaton	*Sporobolus airoides*	P
Bluestem, Big	*Andropogon gerardii*	P
Cordgrass, Prairie	*Spartina pectinata*	P
Indiangrass, Yellow	*Sorghastrum nutans (avenaceum)*	P
Mannagrass	*Glyceria striata*	P, F
Rush, Colorado	*Juncus confusus*	P, F
Switchgrass	*Panicum virgatum*	P, F
Wheatgrass, Slender	*Agropyron trachycaulum (Elymus trachycaulus)*	P
Wheatgrass, Western	*Agropyron (Pascopyrum)smithii*	P, F
Wildrye, Canada or Nodding	*Elymus canadensis*	P, F
Forbs		
Milkweed, Swamp	*Asclepias incarnata*	P, F

[1]P = Plains; F = Foothills

Highly Recommended Native Species for Wetland: Riparian Habitat

Common Name	Desirable Qualities
Cottonwood, Plains	Very common native, wildlife habitat, fast-growing
Willow, Sandbar	Rhizomes help prevent erosion, tolerates periodic flooding
Cordgrass, Prairie	Anchors streambanks in open areas
Switchgrass	Rhizomes help prevent erosion, fast-growing, tolerates periodic shallow flooding
Wildrye, Canada	Rapid establishment, tolerates shade, rhizomes help prevent erosion
Leadplant, Indigobush	Rhizomes help prevent erosion, nitrogen fixer

General Seed Mix for Wetland: Riparian Habitat

This general seed mix is for open areas with a tree canopy of 20% or less. For shadier areas, increase the amount of Canada wildrye. For a wetland mitigation project, this list should include other native species with a wetland rating of FAC or wetter in order to meet the U.S. Army Corps of Engineers definition of a wetland (see Glossary). For custom, site-specific seed mixes, call the NRCS office in Longmont.

Bottomlands				
Species	Common Name	Variety	% Mix	Lbs. (PLS)/Acre
Panicum virgatum	Switchgrass	Grenville	30	1.35
Sorghastrum nutans	Indiangrass	Llana	20	2.0
Andropogon gerardii	Big bluestem	Kaw	20	2.2
Sporobolus airoides	Alkali sacaton		15	0.23
Agropyron smithii	Western wheatgrass	Arriba	15	2.4
Total			100	8.18

Topography

The Wetland: Riparian habitat occurs along stream banks. On steep streambanks, this habitat typically is limited to the streambank's lower portion, which is subject to periodic flooding or has a shallow water table associated with the drainage.

Hydrology

The Wetland: Riparian habitat requires shallow ground water levels that typically occur about 12 to 18 inches below the ground surface during most of the early portion of the growing season. Many of the dominant trees and shrubs, such as peachleaf willow and sandbar willows, require the water table to be at root level for most of the growing season.

Soils

Soils range from thick clayey loams to gravelly alluvium. Many of these soils are unstable and susceptible to erosion.

Management Concerns

• **Weeds:** Many aggressive weeds and introduced species invade the moist disturbed habitat around drainages. To prevent the spread of undesirable plants, revegetate moist areas as soon as possible. Weeds and invasive species include—

Grasses	
Redtop	*Agrostis alba (gigantea)* — Rhizomatous perennial used for hay meadows and reclamation. Competes with native wetland and riparian vegetation.
Reed canarygrass	*Phalaris (Phalaroides) arundinacea — Stout perennial which regenerates from large rootstocks. Often dominant along Boulder's streams and also occurs frequently in marshes.*
Forbs	
Hemlock, poison	*Conium maculatum* — A coarse, stout biennial all plant parts are poisonous including the large, white taproot. Occurs in disturbed areas. Tolerates poorly drained soils, frequents stream banks.
Spurge, Leafy	*Euphorbia esula* — Invades streambanks and other moist soils. Produces a milky white sap that may irritate the skin. Extremely difficult to remove because of the extensive root system that may be 15 feet long.
Loosestrife	*Lythrum salicaria or virgatum* — Perennial associated with moist or marshy sites. Can impede water flow in ditches. Decreases wildlife habitat. Extremely invasive and difficult to remove.
Teasel	*Dipsacus sylvestris* —Tall coarse biennial that forms dense patches in moist areas along irrigation ditches and disturbed sites.
Thistle, Canada	*Cirsium arvense* — Extremely invasive perennial that forms colonies from a deep extensive rhizomatous root system. Very difficult to control because breaking up the roots and rhizomes increases the number of plants. A common problem in disturbed moist soils in the Boulder area.
Whitetop	*Cardaria draba* — Perennial, reproduces from root segments and seeds. Occurs in moist disturbed soils, especially in alkaline areas.
Whitetop, tall	*Lepidium latifolium (Cardaria latifolia)* — Abundant, aggressive weed found along watercourses and other areas with high water tables. Vigorous, creeping root system.

Management Concerns, continued

Trees	
Elm, Siberian	*Ulmus pumila* — Escaped cultivation and has colonized roadsides, and streambanks. Can be used as an indicator to distinguish between the upper and lower riparian zone; it does not tolerate frequent or prolonged inundation or saturated soils.
Russian Olive	*Elaeagnus angustifolia — Threatens riparian corridors by becoming the dominant tree displacing cottonwoods and other native vegetation. Seed commonly dispersed by birds.*
Willow, crack	*Salix fragilis* — Introduced species that competes with native trees along riparian corridors. Very common in the Boulder area.
Willow, white	*Salix alba var. vitellina* — Displaces native willows and cottonwoods in riparian corridors.

• **Erosion Control**: As discussed in Soils, above, erosion can be a severe problem in these drainages, especially in the gravelly soils. Steep banks may require using geotextile fabrics, bioengineering techniques or, in some instances, structural solutions. Bank stabilization methods should be incorporated with the establishment of vegetation. For more information, refer to the City of Boulder Wetland Protection Program BMPs. If erosion results in the loss of vegetative cover, the area should be stabilized and revegetated with the appropriate species as soon as possible. Anchoring the bank with sandbar willow and rhizomatous grasses can help stabilize banks and reduce erosion.

• **Fertilization**: Fertilizers are not recommended in the drainages or on any other wetland restoration/revegetation project as they can leach into the water supply and are not needed to support native vegetation.

WHW Wetland: High Water Table

Description

The Wetland: High Water Table community occurs in areas where the water table is high enough to saturate the soil to within 18 inches or less of the surface for at least a portion of the growing season. Within this simple description occurs a wide variety of plant communities based on subtle differences in the frequency, duration, timing of inundation, depth to groundwater, soil types, and salinity.

At the wet end of the scale, cattails and bulrushes form dense homogenous stands in areas that temporarily pond (see illustration, page 14). Communities of Nebraska sedge, Baltic rush and other species grow in areas with the water table near the surface for most of the year and shallow standing water in the spring and early summer. Stands of cattails and bulrushes occur throughout the Boulder area. Sedge wetlands most commonly occur in wetlands that develop in remnant channel scrolls of the South Boulder Creek flood plain.

In slightly drier areas where the water tables fluctuates through the season, wet meadows of threesquare bulrush, Baltic rush, spikerush, prairie cordgrass, and other grasses occur. Beautiful flowers such as wild blue iris and marsh milkweed add color to these wetlands. The exact species composition of these wet meadows depends on the duration of the high water table, soil types and other factors discussed in the Plant Encyclopedia. The wet meadow communities commonly occur on the historical flood plain of South Boulder Creek.

Another wetland community occurs on harsh alkaline soils of the plains that are inhospitable to most other plants. Alkali grass, inland saltgrass, alkali sacaton, and other saline and alkaline tolerant species thrive on these harsh sites. The alkaline wetland community is common in the Gunbarrel area.

Associated Habitats

Wetland: High Water Table gradually changes into the Wetland: Permanent Standing Water community at the edge of ponds and reservoirs. Buffer Zone: Mesic Grasslands occur at the drier upper borders of this community.

Wetland: High Water Table Native Plant Palette

Common Name	Scientific Name	Zone[1]
Grasses		
Alkali grass	*Puccinellia nuttalliana (airoides)*	P
Alkali sacaton	*Sporobolus airoides*	P
Arrowweed	*Triglochin maritimum*	P
Bluestem, Big	*Andropogon gerardii*	P
Bulrush, alkali	*Scirpus maritimus (Bolboshoenus maritimus* ssp. *paludosus)*	P, F
Bulrush, Hard-stem	*Scirpus acutus (Schoenplectus lacustris* ssp. *acutus)*	P
Bulrush, 3-square or Olney Threesquare	*Scirpus americanus (Schoenoplectus pungens)*	P, F
Bulrush, small fruit	*Scirpus microcarpus*	P, F
Cattail, Broadleaf	*Typha latifolia*	P, F
Cordgrass, prairie	*Spartina pectinata*	P, F
Mannagrass	*Glyceria striata*	P, F
Rush, Baltic or Arctic	*Juncus balticus (arcticus)*	P, F
Rush, Colorado	*Juncus confusus*	P, F
Saltgrass, Inland	*Distichlis spicata (stricta)*	P
Sedge, Nebraska	*Carex nebrascensis*	P, F
Sedge, Woolly	*Carex lanuginosa*	P, F
Spikerush, creeping	*Eleocharis palustris*	P, F
Spikerush, needle	*Eleocharis acicularis*	P, F
Switchgrass	*Panicum virgatum*	P, F
Wheatgrass, Slender	*Agropyron trachycaulum*	P, F
Wheatgrass, Western	*Agropyron (Pascopyrum) smithii*	P,F

[1]P = Plains; F = Foothills

Wetland: High Water Table Native Plant Palette, continued

Forbs		
Iris, wild or western	*Iris missouriensis*	P, F
Milkweed, swamp	*Asclepias incarnata*	P, F
Smartweed	*Polygonum (Persicaria) pensylvanicum*	P, F
Vervain, Blue	*Verbena hastata*	P, F
Water plantain	*Alisma plantago-aquatica (triviale)*	P, F

[1]P = Plains; F = Foothills

Highly Recommended Native Species for Wetland: High Water Table

Common Name	Desirable Qualities
Alkali Sacaton	Will grow on alkaline wet soils.
Bulrush, Hardstem and Softstem	Can be established in shallow marshes. Good alternative to cattail.
Cordgrass, Prairie	Forms a dense sod that stabilizes soils. Alkaline tolerant.
Rush, Baltic	Tolerates a wide range of water regimes. Alkaline tolerant.
Sedge, Nebraska	Useful in open areas with a high water table near the surface for most of the growing season.
Threesquare or Olney Threesquare	Grows in areas of moderately fluctuating water tables. Tolerates alkaline and saline soils.

Habitat

General Seed Mix

Because of the wide variety of plant communities found in this habitat, a general seed mix is not recommended.

Topography

This community occurs in shallow depressions, irrigated hay meadows, flood plains, and next to streambanks and lakeshores.

Hydrology

The water table is within 1 foot or less of the surface for at least a portion of the growing season. Soils can be temporarily inundated but not have permanently standing water. Runoff and irrigation also help support many of these wetlands.

Soils

The soils of this community range from clay frequently associated with threesquare bulrush and baltic rush communities, to soils with organic surface horizons where sedges, prairie cordgrass, and cattails grow. Saline and alkaline clay soils form in low areas where high water tables dissolve salts and sodium and evaporation and capillary action carry the salts near the soil surface.

Management Concerns

	Grasses
Orchardgrass	*Dactylis glomerata* — Perennial grass used for meadows and reclamation on moist sites. Competes with native vegetation.
Redtop	*Agrostis alba (gigantea)* — Rhizomatous perennial used for hay meadows and reclamation. Competes with native wetland and riparian vegetation.
Reed canarygrass	*Phalaris arundinacea* — Stout perennial which regenerates from large rootstocks. Found along streams and in marshes. Very common along perennial drainages and marshes in the Boulder area.
	Forbs
Loosestrife	*Lythrum salicaria L. or virgatum* — Perennial, associated with moist or marshy sites, can impede water flow in ditches. Decreases wildlife habitat. Extremely invasive and difficult to remove.
Whitetop, tall	*Lepidium latifolium (Cardaria latifolia)* — Abundant, aggressive weed found along watercourses and other areas with high water tables. Vigorous, creeping root system.
	Shrubs
Tamarisk	*Tamarix ramosissima* — Very invasive shrub along streams and drainages, especially in salty or alkaline soils. It is so efficient at using water, it can lower the water table. Tamarsik has become established in the Gunbarrel area.

• **Water Regime**: It is critical that the location of the water table and it's seasonal fluctuations are determined. If the water table at a site is higher or lower than originally estimated, species planted to match the estimated hydrologic regime may not survive. Additionally, the water table can be affected by changes in drainage, which may bring more water to the site or lower the water table (e.g., buried utility lines, French drains, basements with sump pumps).

• **Weeds**: Weeds and introduced grasses grow in this habitat type, and should be removed from these revegetated areas.

• **Fertilization**: Fertilizers are not recommended in the drainages as they leach into the water supply and are not needed to support native vegetation.

WSW Wetland: Permanent Standing Water

Description

This habitat type occurs on the shallow edges of ponds, and reservoirs (see illustration, page 16). The vegetation of this community is characterized as rooted in the soil with the leaves and flowers emerging from the water. Toward the middle of the pond, the water gets too deep to support emergent vegetation. Beyond this point, the vegetation consists of submerged or floating plants (this community type is not addressed in these revegetation rules), or open water. At the shallow edges of the ponds, the water levels may fluctuate from inundated to occasionally muddy shorelines that can merge with the Wetland: High Water Table habitat (previously described).

Cattails, bulrushes, and sedges grow in small to large patches along these shorelines, sometimes covering the entire shallow shelf of a pond or reservoir. Broad-leaved forbs such as arrowhead, smartweed, and water plantain may grow in patches between and around the taller plants, especially at the shallower end of the community. In alkaline and saline waters, alkali bulrush predominates. Because cattails are very tolerant of nutrient loading, they flourish in ponds with poor quality urban runoff. This habitat type is generally important in helping filter and trap sediments and excess nutrients, especially in pond and reservoir inlets and outlets.

Associated Habitats: Wetland: Permanent Standing Water may merge with Wetland: High Water Table habitats along shorelines of ponds and lakes.

Wetland: Permanent Standing Water Native Plant Palette

Common Name	Scientific Name	Zone[1]
Bulrush, alkali	*Scirpus maritimus (Bolboschoenus maritimus* ssp. *paludosus)*	P, F
Bulrush, hard-stem	*Scirpus acutus (Schoenoplectus lacutris* ssp. *acutus)*	P, F
Bulrush, small fruit	*Scirpus microcarpus*	P, F
Bur-reed	*Sparganium eurycarpum*	P, F
Cattail, broadleaf	*Typha latifolia*	P, F
Mannagrass	*Glyceria striata*	P, F
Sedge, Nebraska	*Carex nebrascensis*	P, F
Sedge, woolly	*Carex lanuginosa*	P, F
Spikerush, creeping	*Eleocharis palustris*	P, F
Spikerush, needle	*Eleocharis acicularis*	P, F
Forbs		
Arrowhead	*Sagittaria latifolia*	P, F
Smartweed	*Polypogon (Persicaria) pensylvanicum*	P, F
Water plantain	*Alisma plantago aquatica*	P, F

[1]P = Plains; F = Foothills

Highly Recommended Native Species for Wetland: Permanent Standing

Common Name	Desirable Qualities
Arrowhead	Attractive flowering plant is useful in contrast with the taller, glass-like plants of this habitat.
Bulrush, alkali	Grows in alkaline and salty soils in up to 6" of standing water
Bulrush, Hard-stem	Grows in up to 3' of standing water. Stabilizes the shoreline. A good substitute for cattails.
Sedge, Nebraska	Rhizomatous. Can spread rapidly once established.
Sedge, Water	Tolerates pollution. Valuable for erosion control.

Water

Seed Mix

No seed mix is recommended for this community because most of these species are best established from container stock or transplanted plugs.

Topography

This community typically occurs on pond and reservoir shorelines.

Hydrology

This community is associated with standing water varying from a few inches to 3 feet above ground. Water level fluctuations are common.

Soils

Developed soils of this habitat type often have a surface organic horizon from decaying plant material. Many Boulder area ponds and reservoirs are alkaline or saline. In urban areas, these inundated areas may collect pollutants and sediments.

Management Concerns

• **Water Level:** Successful establishment of marshes in permanent standing water typically requires control of water levels. Although at maturity marsh plants may thrive in water 1 to 3 feet deep, transplanted plugs, tubers, and young nursery stock will drown. Plant shoots need to be elevated above the surface of the water to survive. Transplants should be planted in moist soil. Water levels can be gradually increased as shoots elongate, keeping water levels below the height of the elongation of new shoots. Tubers and rhizomes that have not begun to root will often float to the surface if inundated before roots are established. Planting plans should address final planned water levels and match species requirements and tolerances with water depth (see Plant Encyclopedia).

• **Weeds**: Several aggressive weeds can invade the pond edges, including—

Shrubs	
Tamarisk	*Tamarix ramosissima* — Very invasive shrub along streams and drainages., especially in salty or alkaline soils. It is so efficient at using water, it can lower the water table.
Forbs	
Loosestrife	*Lythrum salicaria L.* — Perennial, associated with moist or marshy sites, can impede water flow in ditches. Decreases wildlife habitat. Extremely invasive and difficult to remove.

• **Wildlife**: Many of the plants in this habitat type are important food sources for waterfowl and muskrats. Wildlife, particularly migrating waterfowl, can rapidly consume and decimate new shoreline plantings.

• **Fertilizers**: Do not use fertilizers on this habitat type.

Buffer Zone: Woody Riparian

Description

In the buffer zone above drainages, cottonwoods and a variety of other trees and shrubs grow on elevated terraces and streambanks (see front cover, and page facing the introduction). In moist areas, such as steep north-facing slopes, dense patches of chokecherry, American plum, and currants can grow along the banks shaded by taller trees. On drier slopes and terraces, grasses such as slender and western wheatgrasses grow below widely spaced cottonwoods and scattered shrubs.

The shady, moister canyons of the foothills tend to be more densely vegetated with woody species than the more open streams of the plains. Many woody species such as beaked hazelnut, Rocky Mountain maple, and twinberry grow in the foothills around Boulder but do not occur on the plains.

Associated Habitats

The Buffer Zone: Woody Riparian occurs along the upper banks of drainages and can occur with either the Xeric Grassland or the Mesic Grassland habitats. Wetland: Riparian community occurs below the buffer zone.

Buffer Zone: Woody Riparian Native Plant Palette

Common Name	Scientific Name	Zone[1]
Trees		
Box Elder	*Acer negundo (Negundo aceroides ssp. interius)*	P, F
Cottonwood, Lanceleaf	*Populus x acuminata* (hybrid)	P, F
Cottonwood, Narrowleaf	*Populus angustifolia*	F
Cottonwood, Plains	*Populus deltoides (sargentii)*	P, F
Hackberry, Netleaf	*Celtis reticulata*	F
Hawthorn, Redtwigged	*Crataegus erythropoda*	F
Hazelnut, Beaked	*Corylus cornuta*	F
Juniper, Rocky Mountain	*Juniperus (Sabina) scopulorum*	F
Shrubs		
Alder	*Alnus tenuifolia (incana ssp. tenuifolia)*	F
Chokecherry, Western	*Prunus (Padus) virginiana* ssp. *melanocarpa*	P, F
Currant, Common or Whitestem	*Ribes inerme*	F
Currant, Wax	*Ribes cereum*	P, F
Dogwood, Redosier	*Cornus stolonifera (Swida sericea)*	F
Leadplant, Indigobush	*Amorpha fruiticosa*	P, F
Maple, Rocky Mountain	*Acer glabrum*	F
Plum, American or Wild	*Prunus americana*	P, F
Rose, Wood's	*Rosa woodsii*	P, F
Serviceberry, Saskatoon	*Amelanchier alnifolia*	P, F
Snowberry, Western	*Symphoricarpos occidentalis*	P, F
Snowberry, White	*Symphoricarpos albus*	F
Twinberry or Bush Honeysuckle	*Lonicera (Distegia) involucrata*	F

[1]P = Plains; F = Foothills

Buffer Zone: Woody Riparian Native Plant Palette, continued

Vines		
Virginsbower, Western	*Clematis ligusticifolia*	P, F
Grape, River	*Vitis riparia*	F
Grasses/Grass-like		
Alkali Sacaton	*Sporobolus airoides*	P
Bluestem, Big	*Andropogon gerardii*	P
Bluestem, Little	*Schizachyrium (Andropogon)scoparium*	P
Buffalo grass	*Buchloe dactyloides*	P
Grama, Blue	*Bouteloua gracilis*	P, F
Grama, Sideoats	*Bouteloua curtipendula*	P, F
Indiangrass, Yellow	*Sorghastrum nutans (avenaceum)*	P
Needlegrass, Green	*Stipa (Nassella) viridula*	P, F
Ricegrass, Indian	*Oryzopsis hymenoides*	
Rush, Colorado	*Juncus confusus*	P, F
Switchgrass	*Panicum virgatum*	P, F
Wheatgrass, Slender	*Agropyron trachycaulum (Elymus trachycaulus)*	P
Wheatgrass, Western	*Agropyron (Pascopyron) smithii*	P, F
Wildrye, Canada or Nodding	*Elymus canadensis*	P, F
Forbs		
Milkweed, Showy	*Asclepias speciosa*	P, F
Prairieclover, Purple	*Petalostemon purpureum (Dalea purpurea)*	P

[1]P = Plains; F = Foothills

Highly Recommended Native Species for Buffer Zone:Woody Riparian

Common Name	Desirable Qualities
Chokecherry	Bank stabilization, wildlife habitat
Cottonwood (all species)	Very common natives, wildlife habitat, fast-growing
Plum, American	Attractive flowering shrub; wildlife habitat.
Switchgrass	Rhizomes help prevent erosion, fast-growing
Wildrye, Canada	Tolerates shade, rhizomes help reduce erosion
Wheatgrass, Western	Rhizomatous; helps reduce erosion.
Wood's Rose	Attractive plant for the edge of woods

Native Seed Mix for Buffer Zone: Woody Riparian

Depending on the soil type, use the following mixes. For a more site-specific mix, call the NRCS office in Longmont.

Well-Drained Loamy Soils				
Species	Common Name	Variety	% Mix	Lbs.(PLS)/ Acre
Agropyron smithii	Western wheatgrass	Arriba	35	5.6
Agropyron trachycaulum	Slender wheatgrass	Primar	5	0.6
Andropogon gerardii	Big bluestem	Kaw	5	0.6
Elymus canadensis	Canada wildrye		5	0.5
Oryzopsis hymenoides	Indian ricegrass	Paloma	5	0.6
Panicum virgatum	Switchgrass	Grenville	20	0.9
Schizachyrium scoparium	Little bluestem	Pastura	5	0.4
Sporobolus airoides	Alkali sacaton	Native	25	0.4
Total			100	9

Native Seed Mix for Buffer Zone: Woody Riparian, continued

Well-Drained Gravelly Soils				
Species	Common Name	Variety	% Mix	Lbs.(PLS)/ Acre
Agropyron smithii	Western wheatgrass	Arriba	30	3.2
Bouteloua curtipendula	Sideoats grama	Vaughan	20	1.8
Bouteloua gracilis	Blue grama	Lovington	15	0.5
Buchloe dactyloides	Buffalo grass	Native	5	0.8
Oryzopsis hymenoides	Indian ricegrass	Paloma	5	0.6
Stipa comata	Needle and thread		15	2.3
Stipa viridula	Green needlegrass		10	1.0
Total			100	10.2

These general mixes are best used in open areas and for projects where the woody vegetation is just being established. For shady areas under mature trees, use more shade tolerant species such as Canada wildrye and some of the wheatgrasses.

Topography

This community occurs on the upper streambanks and elevated terraces where soils are drier and rarely flooded.

Hydrology

In the Buffer Zone: Woody Riparian, the water table is deeper than 1 foot. Trees and shrubs that require less water, such as cottonwood and chokecherry, should be planted in this zone. However, cottonwoods and other woody plants will require supplemental watering until they can grow roots long enough to tap into the water table or develop root systems that collect soil moisture to support the plants. Typically, woody vegetation will require supplemental watering for two to three growing seasons (see Wetland BMPs).

Soils

Soils range from thick clayey loams to areas of gravely alluvium. Erosion of upper stream banks and terraces can be a problem especially in more gravely areas.

Management Concerns

• **Weeds**: Many aggressive weeds and introduced species invade the moist disturbed habitat around drainages, including—

Grasses	
Brome, Smooth	*Bromus inermis* — Competes with native vegetation via extensive underground roots.
Cheatgrass	*Bromus tectorum L.* — Winter annual, out-competes native vegetation especially in drier areas. Fire hazard.
Wheatgrass, crested	*Agropyron cristatum* — Reclamation grass, persistent, out competes native grasses. Found along roadsides, trails, disturbed areas.
Forbs	
Burdock	*Arctium minus* — Biennial, competes with native vegetation. Often dispersed by sticking to hair of livestock.
Hemlock, Poison	*Conium maculatum L.*— All plant parts are poisonous, including large, white taproot. Biennial, tolerates poorly drained soils, frequents stream banks.
Spurge, Leafy	*Euphorbia esula L.* — Invades streambanks and other moist soils. Produces a milky white sap that may cause severe irritation to the skin. Extremely difficult to remove because of the extensive root system that may be 15 feet long.
Teasel	*Dipacus fullonum L.* —Tall plant that forms dense patches in moist areas along irrigation ditches and disturbed sites.
Thistle, Canada	*Cirsium arvense* — Extremely invasive weed that forms colonies from a deep extensive rhizomatous root system. Very difficult to control because breaking up the roots increases the number of plants. Grows in disturbed, moist ground.
Thistle, Musk	*Carduus nutans L.*— Biennial, spreads rapidly forming extremely dense stands that crowd out desirable plants.
Toadflax, Spotted	*Linaria genistifolia* ssp. *dalmatica* — Perennial, extensive deep root system, difficult to control. Grows along roadsides and in open rangeland.
Trees	
Elm, Siberian	*Ulmus pumila* — Escaped cultivation and has colonized roadsides, and streambanks.
Russian Olive	*Elaeagnus angustifolia* — Threatens riparian corridors by becoming the dominant tree displacing cottonwoods and other native vegetation. Seed commonly dispersed by birds.
Willow, Crack	*Salix fragilis* — Introduced species that competes with native trees along riparian corridors.
Willow, White	*Salix alba var. vitellina* — Displaces native willow, cottonwood in riparian corridors.

To prevent the spread of these undesired plants, a critical step is to revegetate moist areas as soon as possible.

• **Erosion Control**: As discussed in Soils, above, erosion can be a severe problem in these drainages, especially in the gravelly soils. Steep banks may require using geotextile fabrics, bioengineering techniques or, in some instances, structural solutions. Bank stabilization methods should be incorporated with the establishment of vegetation. For more information, refer to the City of Boulder Wetland Protection Program BMPs. If erosion results in the loss of vegetative cover, the area should be stabilized and revegetated with the appropriate species as soon as possible. Anchoring the bank with rhizomatous grasses can help stabilize banks and reduce erosion.

• **Irrigation**: Successful establishment of grasses typically requires irrigation during the first year. Irrigation can be used to help weed control — in early spring, areas with weeds such as cheatgrass can be tilled under; in late spring the desired grass species can be planted and irrigated. Otherwise the grasses would need to be seeded early in the spring when adequate moisture is present. However, at this time cheatgrass is vigorously growing and taking moisture and nutrients from native plants.

• **Fertilization**: Fertilizers are not recommended in the drainages as they leach into the water supply and are not needed to support native vegetation.

Buffer Zone: Mesic Grassland

Description

In the moister areas of Boulder valley and the base of the foothills grow tall grass prairie species such as big bluestem, yellow Indiangrass, and switchgrass that are more typically found in the Midwest where rainfall averages more than 20" instead of only 12" to 18" on the western plains. These tall grass species survive in this dryer region because they occur along streams, in subirrigated meadows, and in areas of gravelly soils that hold enough moisture to make up for the lack of sufficient precipitation.

In moist areas, such as the historical South Boulder Creek flood plain, big bluestem, yellow Indiangrass, and switchgrass grow over 3 feet tall. Throughout the fall and winter, meadows of these grasses turn a beautiful golden-red color providing an attractive contrast to the muted yellowish brown of the rest of the prairie (see front cover).

In slightly drier soils big bluestem can be found with shorter grasses such as sideoats grama, blue grama, and little bluestem. Grasslands of western wheatgrass and slender wheatgrass also occur on the moister slopes and shallow depressions of the prairie. Shrubs such as rubber rabbitbrush and skunkbush can be found scattered on these grassy slopes. In shallow depressions, dense patches of Woods' rose and western snowberry occur.

Associated Habitats

In areas such as the broad historical flood plain of South Boulder Creek, mesic grasslands may be interspersed with wetland and riparian habitats. The Buffer Zone: Mesic Grassland occurs in the intermediately moist region between the three Wetland communities and the drier Buffer Zone: Xeric Grassland. On the more protected, moist upper banks of drainages, this community can occur with the Buffer Zone: Woody Riparian community. Xeric Grasslands occupy drier more exposed areas of these upper banks.

Buffer Zone: Mesic Grassland Native Plant Palette

Common Name	Scientific Name	Zone[1]
Shrubs		
Rabbitbrush, Rubber	*Chrysothamnus nauseosus*	P, F
Rose Wood's	*Rosa woodsii*	P, F
Sagebrush, Silver	*Artemesia (Seriphidium) cana*	P, F
Snowberry, Western or Wolfberry	*Symphoricarpos occidentalis*	P, F
Grass/Grass-Like		
Alkali Sacaton	*Sporobolus airoides*	P
Bluestem, Big	*Andropogon gerardii*	P
Bluestem, Little	*Schizachyrium scoparium*	P
Grama, Blue	*Bouteloua gracilis (Chondrosum gracile)*	P, F
Grama, Sideoats	*Bouteloua curtipendula*	P, F
Indiangrass, Yellow	*Sorghastrum nutans*	P
Needlegrass, Green	*Stipa viridula*	P, F
Switchgrass	*Panicum virgatum*	P, F
Wheatgrass, Slender	*Agropyron trachycaulum*	P
Wheatgrass, Western	*Agropyron (Pascopyrum) smithii*	P, F
Wildrye, Canada	*Elymus canadensis*	P, F
Forbs		
Coneflower, Prairie or Mexican Hat	*Ratibida columnifera*	P, F
Milkweed, Showy	*Asclepias speciosa*	P, F
Prairieclover, Purple	*Petalostemon purpureum (Dalea purpurea)*	P
Sunflower, Common	*Helianthus annus*	P, F

[1]P = Plains; F = Foothills

Highly Recommended Native Species for Buffer Zone: Mesic Grassland

Common Name	Desirable Qualities
Bluestem, Big	Dominant plant on very moist sites
Bluestem, Little	Widespread species on sandier, drier sites than big bluestem
Rubber Rabbitbrush	Useful for bank stabilization on south facing slopes with western wheatgrass
Snowberry, Western or Wolfberry	Helps control erosion on grassy swales
Wheatgrass, Western	Rhizomatous sod-former stabilizes grassy depressions and drainages. Tolerates drought.
Wood's Rose	Attractive plant on upper banks

Native Seed Mix for Buffer Zone: Mesic Grassland

For site-specific, customized seed mixes, call NRCS in Longmont.

Bottomlands				
Common Name	Species	Variety	% Mix	Lbs. (PLS)/Acre
Alkali sacaton	*Sporobolus airoides*		15	0.23
Big bluestem	*Andropogon gerardii*	Kaw	20	2.2
Indiangrass	*Sorghastrum nutans*	Llana	20	2.0
Switchgrass	*Panicum virgatum*	Grenville	30	1.35
Western wheatgrass	*Agropyron smithii*	Arriba	15	2.4
Total			100	8.18

Topography

This community occurs on sheltered upper streambanks with moist soils. It can be found on lowland flood plains and slight depressions. It also can occur on gentle slopes with gravelly soils in outwash mesas at the base of the foothills.

Hydrology

Buffer Zone: Mesic Grassland communities occur where the soils hold moisture equivalent to areas with greater than the average local rainfall. This includes flood plain meadows where the soils are moist but not saturated, and protected upper banks of drainages. The amount of extra moisture determines the plant community. This soil moisture can vary from slightly above the average rainfall to soil moisture levels equivalent to an average precipitation of 20 inches or more a year.

Soils

This community typically occurs in areas of deep loams that range in texture from cobbly sandy to clay. One interesting soil type includes the cobbly substrate found on the outwash mesas near the foothills. These porous soils allow the water to drain down to a lower level where it collects and provides more moisture to the plant then is available from direct precipitation.

Management Concerns

• **Weeds**: Many aggressive weeds and introduced species invade the moist soils of this community, including—

Grasses	
Wheatgrass, Crested	*Agropyron cristatum* — Reclamation grass, persistent, out competes native grasses. Found along roadsides, trails, disturbed areas.
Redtop	*Agrostis alba (gigantea)* — Rhizomatous perennial used for hay meadows and reclamation. Competes with native wetland and riparian vegetation.
Brome, Smooth	*Bromus inermis* — Competes with native vegetation via extensive underground roots.
Forbs	
Thistle, Canada	*Cirsium vulgare* — Highly competitive weed on disturbed sites and roadsides.
Leafy Spurge	*Euphorbia esula L.* — Invades streambanks and other moist soils. Produces a milky white sap that may cause severe irritation to the skin. Extremely difficult to remove because of the extensive root system that may be 15 feet long.
Thistle, Musk	*Carduus nutans L.*— Biennial, spreads rapidly forming extremely dense stands which crowd out desirable plants.

To prevent the spread of these undesired plants, a critical step is to revegetate all areas as soon as possible. This is especially important in very moist areas where Canada thistle can take over. Once established, Canada thistle and many of these other species are extremely hard to remove.

• **Erosion Control**: Upper banks of drainages and slopes are susceptible to erosion. Planting these areas with rhizomatous mesic grasses as soon as possible helps reduce soil loss.

• **Irrigation**: Successful establishment of grasses typically requires irrigation during the first year.

• **Fertilization**: Fertilizers are not recommended in the drainages as they leach into the water supply and are not needed to support native vegetation.

Buffer Zone: Xeric Grassland

Description

Although this is not a community usually considered when discussing buffer zones and wetlands, Xeric Grasslands do grow on the upper edge of streambanks and wetlands as an extension of the dry prairie typical of the high plains of Colorado (see illustration on page 42).

Short grasses such as blue grama and buffalograss dominate large areas of the prairie especially on dry, clayey soils. Scattered throughout the short grass prairie are yucca, sages, and other shrubs. Numerous showy wildflowers such as the bright orange cowboy's delight, purple dotted gayfeather, and the white Easter daisy provide color to this grassland. Where more moisture occurs, mid grasses, such as Green needlegrass, western wheatgrass, and needle-and-thread grass, appear.

Associated Habitats

The Buffer Zone: Xeric Grassland occurs in the drier more exposed portion of the buffer zone and may occur with Mesic Grasslands and Woody Riparian communities.

Buffer Zone: Xeric Grassland Native Plant Palette

Common Name	Scientific Name	Zone[1]
Shrubs		
Rabbitbrush, Rubber	*Chrysothamnus nauseosus*	P, F
Sage, Fringed	*Artemesia frigida*	P, F
Sagebrush, Prairie	*Artemisia ludoviciana*	P, F
Sumac, Skunkbush	*Rhus triolobata (aromatica* ssp. *trilobata)*	P, F
Yucca or Soapweed	*Yucca glauca*	P
Grass/Grass-Like		
Buffalograss	*Buchloe dactyloides*	P
Grama, Blue	*Bouteloua gracilis (Chondrosum gracile)*	P, F
Grama, Sideoats	*Bouteloua curtipendula*	P, F
Needle and Thread	*Stipa comata*	P, F
Needlegrass, Green	*Stipa viridula*	P, F
Ricegrass, Indian	*Oryzopsis (Stipa) hymenoides*	P
Wheatgrass, Western	*Agropyron (Pascopyrum) smithii*	P, F
Forbs		
Blanketflower, Native	*Gaillardia aristata*	P, F
Coneflower, Prairie or Mexican Hat	*Ratibida columnifera*	P, F
Cowboy's Delight or Scarlet Globemallow	*Sphaeralcea coccinea*	P, F
Daisy, Easter	*Townsendia exscapa*	P
Flax, Wild blue	*Linum (Adendolinum) lewisii*	P, F
Gayfeather, Dotted	*Liatris punctata*	P, F
Onion, Nodding	*Allium cernuum*	F
Penstemon, Rocky Mountain	*Penstemon strictus*	F
Prairieclover, Purple	*Petalostemon purpureum (Dalea purpurea)*	P
Pussytoes, Rose	*Antennaria rosea*	F
Sandverbena, Snowball	*Abronia fragrans*	F
Sunflower, Common	*Helianthus annuus*	P, F

[1]P = Plains; F = Foothills

Highly Recommended Native Species Buffer Zone: Xeric Grassland

Common Name	Desirable Qualities
Buffalograss	One of the dominant plants of the short grass prairie. Useful for soil stabilization, especially on dry, clay soils.
Grama, Blue	One of the dominant plants of the short grass prairie. Sod former. Useful for soil stabilization. Very drought tolerant.
Ricegrass, Indian	Very drought tolerant. Grows in dry sandy areas that are difficult to establish other plants.
Sage, fringed	Common plant on open exposed sites

Native Seed Mix for Buffer Zone: Xeric Grassland

Call the NRCS in Longmont for site-specific mixes, or use the following general mix—

Well-Drained Gravelly Soils				
Common Name	Species	Variety	% Mix	Lbs.(PLS)/Acre
Western Wheatgrass	*Agropyron smithii*	Arriba	30	3.2
Sideoats Grama	*Bouteloua curtipendula*	Vaughan	20	1.8
Blue Grama	*Bouteloua gracilis*	Lovington	15	0.5
Needle and Thread	*Stipa comata*		15	2.3
Green Needlegrass	*Stipa viridula*		10	1.0
Buffalo Grass	*Buchloe dactyloides*	Native	5	0.8
Indian Ricegrass	*Oryzopsis hymenoides*	Paloma	5	0.6
Total			100	10.2

Topography

The Buffer Zone: Xeric Grassland community occurs on the upper slopes of drainages and other wetlands, especially on the south-facing slopes and other exposed areas. It also occurs on the level plains adjacent to these drainages.

Hydrology

This community occurs on the dry, upper edge of the buffer zones. Most of the species require well-drained soils and do not tolerate prolonged saturation of the root zone.

Soils

The well-drained soils of this community range from gravelly to loamy alluvium. The loamy soils may vary from coarse sandy loams to clay loams.

Management Concerns

• **Weeds**: The following invasive weeds tolerate the dry conditions of this habitat, especially in disturbed areas.

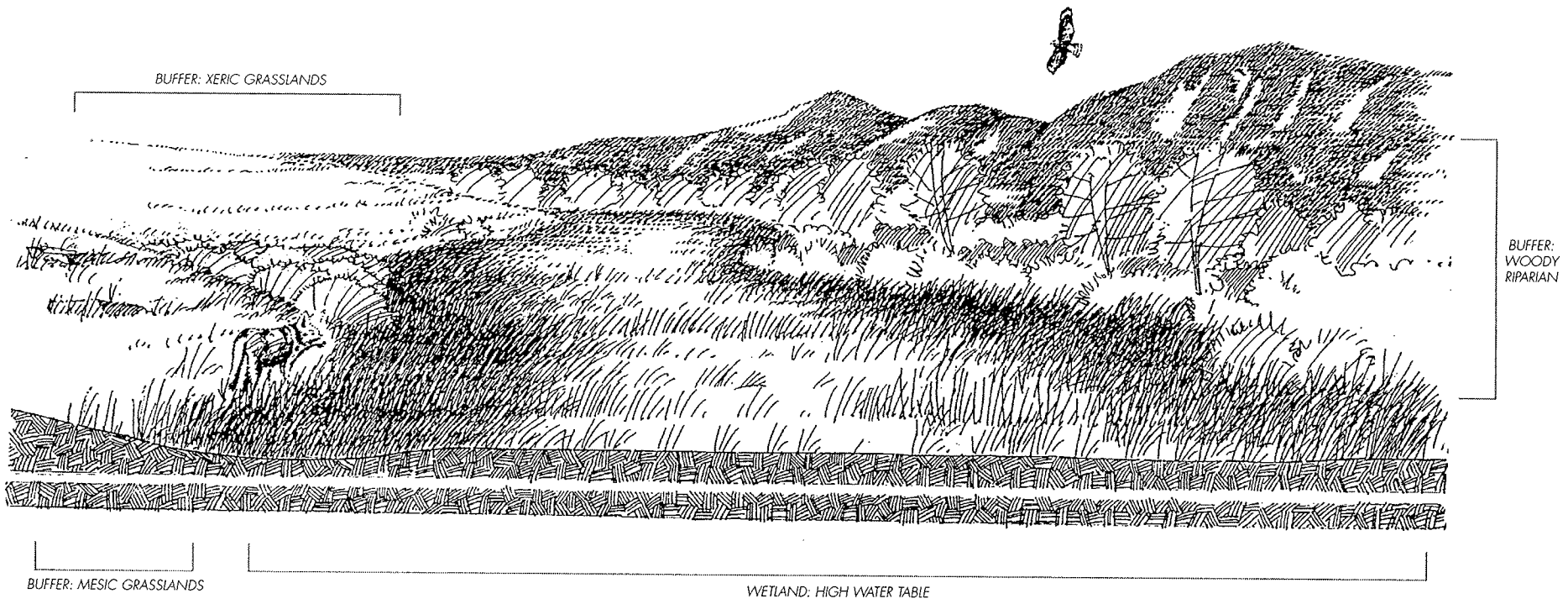
Grasses	
Cheatgrass	*Bromus tectorum L.* — Winter annual, out-competes native vegetation especially in drier areas. Fire hazard.
Wheatgrass, Crested	*Agropyron cristatum* — Reclamation grass, persistent, may out compete native grasses. Found along roadsides, trails, disturbed areas.
Forbs	
Bindweed, Field	*Convovulus arvensis L.*— Perennial, with extensive root system, stems climb or form dense tangled mats. Difficult to control due to long, deep taproot.
Knapweed, Diffuse	*Centaurea (Acosta) deffusa* — Annual, highly competitive, found along roadsides, waste areas and dry rangelands.
Knapweed, Russian	*Centaurea (Acroptilon) repens L.* — Perennial, spreads by black, deep growing roots along roadsides, pastures, and cultivated fields.
Knapweed, Spotted	*Centaurea (Acosta) maculosa* — Short-lived perennial that competes with native vegetation in dry meadows, pasturelands and in flood plains.

To prevent the spread of these undesired plants, a critical step is to revegetate all areas as soon as possible.

• **Erosion Control**: The sandier soils of this habitat type are susceptible to wind and water erosion. Plant cover should be established quickly to prevent soil loss.

• **Irrigation**: Successful establishment of grasses typically requires irrigation during the first year. Irrigation can be used to help weed control — in early spring, areas with weeds such as cheatgrass can be tilled under; in late spring the desired grass species can be planted and irrigated. Otherwise the grasses would need to be seeded early in the spring when adequate moisture is present. However, at this time cheatgrass is vigorously growing and taking moisture and nutrients from native plants.

• **Fertilization**: Fertilizers are not recommended as they are not needed to support native vegetation.


BUFFER: XERIC GRASSLANDS
BUFFER: WOODY RIPARIAN
BUFFER: MESIC GRASSLANDS
WETLAND: HIGH WATER TABLE

Plant Encyclopedia

Trees

Box Elder -
Acer negundo (Negundo aceroides ssp. interius)

Plant Characteristics
The three-parted leaves are light yellow-green on top and pale green below. They turn a soft brownish yellow in the fall. Yellow flowers bloom in early spring before the foliage appears. Winged, maple-like fruit appears in fall.

Mature Height
60' to 70'

Mature Spread
25'

Flowering Period
Spring

Growth Rate
Rapid

Available Plant Forms
Containers

Exposure
Sun

Water Needs
Moist to seasonally saturated.

Wetland Indicator
FAC

Soils
Occurs in poor soils where other plants do not grow well.

Habitat Characteristics
Forms clumps of trees along stream banks and in flood plains.

Landscape Use
Use as one of the dominant tree species along streams in more naturalized settings. Useful in poor soils.

Management Concerns
Box elder is not a desirable street tree; it is relatively short-lived and can become infested with box elder beetles.

Zone
Foothills, plains

Wildlife Value
Seeds eaten by squirrels, mice, and small birds.

Cottonwood, Narrowleaf -
Populus angustifolia

Plant Characteristics
The slender branches of this tall tree form a conical crown. Shiny, soft green leaves turn gold in the fall. Can be distinguished by large, aromatic buds.

Mature Height
40' to 60'

Mature Spread
35'

Flowering Period
Spring

Growth Rate
Fast

Available Plant Forms
"Cottonless" and native (may be hard to find) containers, stock, bare root

Exposure
Sun

Water Needs
Requires seasonal flooding until the roots reach the water table. After establishment, adaptable provided the roots remain in contact with the water table.

Wetland Indicator
FAC

Soils
Adaptable

Habitat Characteristics
Narrowleaf cottonwood grows in the canyons of the foothills to the edge of the plains. Provides good shade in riparian areas. Tends to sucker, which helps stabilize the banks. Associates with shrub willows, alder, and twinberry.

Landscape Use
Use in natural settings as the dominant tree species of drainages.

Management Concerns
Will sucker in most situations, which may not be desired in more formal settings.

Zone
Foothills.

Wildlife Value
Provides cover for birds and large mammals.

Cottonwoods are available in two varieties
1) Native, which produce copious amounts of white fluffy seeds; and 2) "Cottonless," which do not produce seeds. In open land and other relatively undisturbed sites, use only native varieties that produce seeds, which will allow for natural regeneration and provide better habitat.

WR BWR

Cottonwood, Lanceleaf -
Populus x acuminata

Plant Characteristics
The densely branched limbs form a rounded crown. Egg-shaped leaves have an abruptly narrow tip and turn from shiny light green in the summer to yellow in the fall.

Mature Height
40' to 60'

Mature Spread
30' to 40'

Flowering Period
Spring

Growth Rate
Fast

Available Plant Forms
Containers

Exposure
Sun

Water Needs
Requires seasonal flooding, until the roots reach the water table. After establishment, adaptable provided the roots remain in contact with the water table.

Wetland Indicator
FAC

Soils
Adaptable

Habitat Characteristics
This is a natural, sterile hybrid between plains and narrowleaf cottonwoods. Reproduces by suckering and branch rooting. Grows in the lower canyons of the foothills and the edge of the plains.

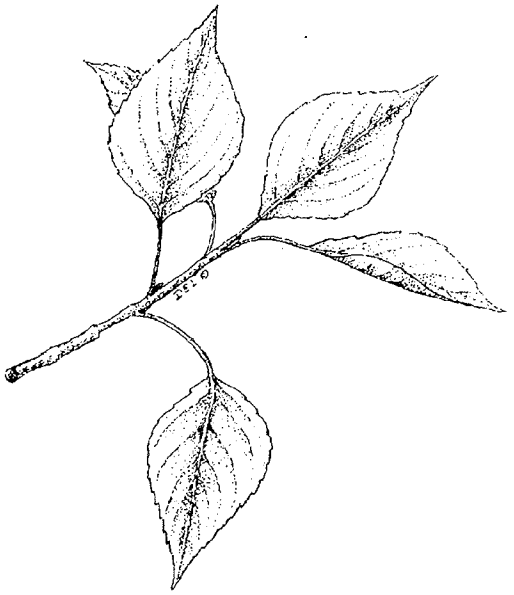
Landscape Use
Use in natural settings of drainages.

Management Concerns
Will sucker in most situations, which may not be desired in more formal settings.

Zone
Foothills, plains

Wildlife Value
Provides cover for birds and large mammals.

Habitat Types
Wetland: Riparian,
Buffer Zone: Woody Riparian



WR BWR

Cottonwood, Plains -
Populus deltoides (sargentii)

Plant Characteristics
The long, spreading branches of this tree form a broad, irregularly rounded canopy. The gray bark becomes deeply furrowed as the tree ages. Broad triangular leaves are light green in the summer changing to bright gold in the fall.

Mature Height
80'

Mature Spread
50'

Flowering Period
Spring

Growth Rate
Fast

Available Plant Forms
"Cottonless" and native (may be hard to find) poles, containers

Exposure:
Sun, especially during seedling establishment

Water Needs
Requires seasonal flooding, until the roots reach the water table. After establishment, adaptable provided roots remain in contact with the water table.

Wetland Indicator
FAC

Soils
Adaptable

WR BWR

Hackberry, Netleaf -
Celtis reticulata

Plant Characteristics
These trees form a scraggly crown. The thick leaves have a prominent web of veins. Orange-red, spherical-shaped fruit.

Mature Height
25'

Mature Spread
N/A

Flowering Period
Early Spring

Growth Rate
NA

Available Plant Forms
Not available commercially

Exposure
NA

Water Needs
Dry to moist

Wetland Indicator
FAC

Soils
Rocky banks, occasionally sandy soils

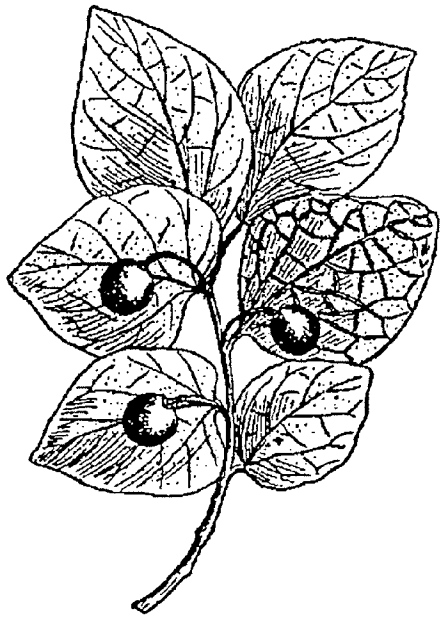
Habitat Characteristics
Grows in drier areas along intermittent streams at the base of the foothills.

Landscape Use
Along the upper banks of the woody riparian area as an understory tree or in more open areas.

Management Concerns
NA

Zone
Foothills

Wildlife Value
Cover



Hawthorn, Red-twigged

Crataegus erythropoda

Plant Characteristics

Numerous, smooth shiny thorns occur on the branches of this small tree. The leaves are shiny and coarsely toothed. The small fruit turns dark purplish-red.

Mature Height

Small trees

Flowering Period

NA

Growth Rate

NA

Available Plant Forms

Not currently available commercially.

Exposure

Sun

Water Needs

Adaptable to dry

Wetland Indicator

Not rated

Soils

NA

Habitat Characteristics

Occurs along intermittent streams and on drier hillsides.

Landscape Use

In naturalized settings along streams and in the drier gullies.

Management Concerns

Because of the thorns, this would not be appropriate in more urbanized settings.

Zone

Foothills

Wildlife Value

Good wildlife value

Hazelnut, Beaked -
Corylus cornuta

Plant Characteristics
The hairy, round leaves have irregularly toothed edges. The edible nuts are enclosed in a green or papery husk.

Mature Height
10'

Mature Spread
NA

Flowering Period
NA

Growth Rate
NA

Available Plant Forms
Not currently available commercially

Exposure
Sun to partial shade

Water Needs
Moist to adaptable

Wetland Indicator
FACU

Soils
NA

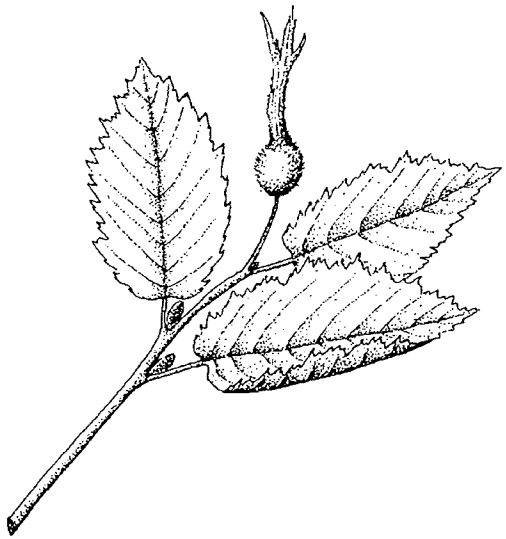
Habitat Characteristics
Occurs in the moist soils of cool ravines and hillsides of the outer foothills.

Landscape Use
As a small understory tree in wooded drainages.

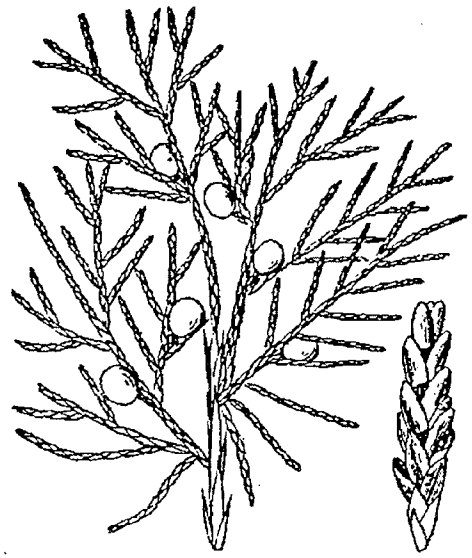
Management Concerns
NA

Zone
Foothills

Wildlife Value
Good wildlife value



Juniper, Rocky Mountain -
Juniperus (Sabina) scopulorum



Plant Characteristics
Small, evergreen tree with a shape that varies from pyramidal to rounded. Small, scale-like leaves range in color from green to gray. The berry-like fruit changes from green to bluish-purple.

Mature Height
20' to 30'

Mature Spread
8' to 12'

Flowering Period
NA

Growth Rate
Long-lived; very slow growing

Available Plant Forms
Containers

Exposure
Sun to filtered shade

Water Needs
Adaptable to dry

Wetland Indicator
Upland

Soils
Adaptable; can grow on thin soils

Habitat Characteristics
Although most commonly found on dry slopes in the lower foothills, Rocky Mountain juniper also occurs along intermittent stream beds and on upper riparian slopes.

Landscape Use
Can be used in the upper edge of the buffer zone intermixed with other trees and shrubs or planted together as a screen.

Management Concerns
Attracts deer, which may not be desirable near buildings. Branches break easily in the snow.

Zone
Foothills

Wildlife Value
Numerous bird and animal species eat the berry-like fruit. Deer eagerly eat the lower branches.

Willow, Peachleaf -
Salix amygdaloides

Plant Characteristics
The form of this tree varies from upright from a main trunk to spreading from one or more main trunks. The lance-like leaves are yellowish-green above and a soft pale green below and change to a soft yellow in the fall.

Mature Height
30' to 40'

Mature Spread
25' to 30'

Flowering Period
Mid to late spring

Growth Rate
Rapid growth

Available Plant Forms
Containers

Exposure
Sun

Water Needs
Wet to adaptable; requires seasonal flooding for establishment

Wetland Indicator
FACW

Soils
Alluvial

Habitat Characteristics
Usually occurs in slightly wetter locations than cottonwoods. Very commonly found along streambanks and lake margins. In order to germinate, it requires flooding that creates bare sandbars for the seeds to grow.

Landscape Use
Good as one of the dominant trees in wetter areas along streambanks and lake margins.

Management Concerns
This short-lived, fast-growing tree may not be suitable to urban areas, especially near sidewalks and streets.

Zone
Plains, foothills

Wildlife Value
Cover and nesting sites for songbirds.

WR

Shrubs

Alder, Thinleaf -
Alnus tenuifolia (incana ssp. tenuifolia)

Plant Characteristics
Thinleaf alder forms large shrubs or small trees with many stems, oval to rounded in shape. The main stems are gray with slender, red upper branches. Bright-green, oval-shaped leaves with toothed margins turn yellow in the fall Throughout the winter, the small, reddish-brown, cone-like fruits adhere to the upper branches.

Mature Height
30'

Mature Spread
20'

Flowering Period
Early spring

Growth Rate
Fast

Available Plant Forms
Containers, seed

Exposure
Adaptable

Water Needs
Seasonally flooded

Wetland Indicator
FACW

Soils
Adaptable including sandy soils

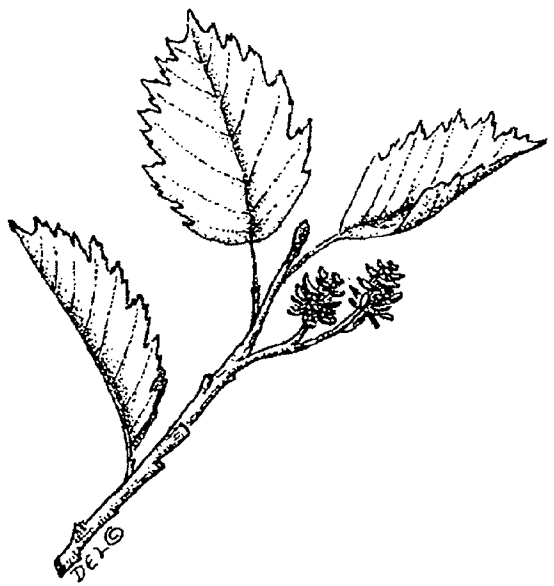
Habitat Characteristics
Forms spreading clumps of multi-branched stems. Provides shade over mountain streams. Often occurs with river birch.

Landscape Use
Plant in moister shadier areas of the buffer zone. In wetland areas it can be planted along the streams.

Management Concerns
None

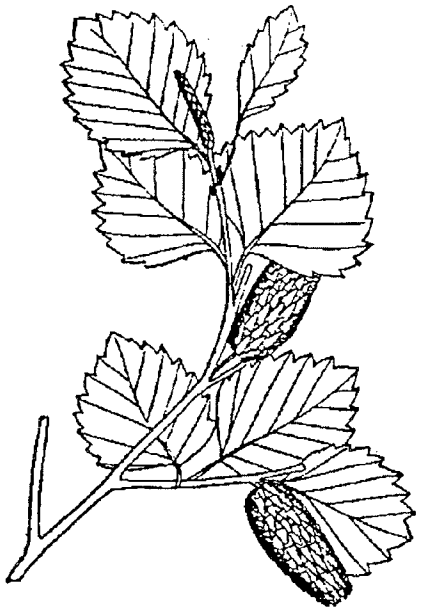
Zone
Foothills

Wildlife Value
Provides cover for birds and large mammals. Birds feed on the seeds.



WR BWR

Birch, River -
Betula fontinalis (occidentalis)



Plant Characteristics
This small tree to large shrub has many slender mainstems with non-peeling cinnamon brown bark. The arching branches form a rounded shape. Rich dark green leaves change to a golden yellow in the fall.

Mature Height
15' to 35'

Mature Spread
15' to 25'

Flowering Period
Late spring

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Sun to filtered shade

Water Needs
Wet to adaptable. Seasonal flooding.

Wetland Indicator
FACW

Soils
Adaptable including sandy soils.

Habitat Characteristics
Always found near water in the canyon bottoms of the outer foothills. Often occurs with alder.

Landscape Use
Planted next to streams, it provides shade for streams and helps stabilize the banks.

Management Concerns
NA

Zone
Foothills

Wildlife Value
Cover for birds and large mammals.

Chokecherry, Western

Prunus (Padus) virginiana ssp. melanocarpa

Plant Characteristics

Erect branches form an oval, rounded crown with dense foliage. Grows from rhizomes. The large, thin leaves are dark green above and lighter below. Leaves turn yellow or red in the fall. In mid-spring, drooping clusters of small, fragrant white flowers bloom. The black, slightly sour berries are used by wildlife and make excellent jellies, syrups, or wines.

Mature Height

15' to 30'

Mature Spread

20'

Flowering Period

Mid-spring

Growth Rate

Fast

Available Plant Forms

Containers

Exposure

Sun to partial shade to shade

Water Needs

Dry to moderate

Wetland Indicator

FACU

Soils

Adaptable; prefers seasonally moist

Habitat Characteristics

Common on the upper banks of streams and gullies of the foothills and plains. Forms loose thickets.

Landscape Use

This large bushy shrub is an excellent understory plant for screening riparian areas and providing wildlife habitat.

Management Concerns

May not be desirable in a formal setting next to buildings as it tends to sucker and is very palatable to deer. May need to be fenced during establishment to protect from deer. This shrub is also susceptible to insects and diseases.

Zone

Foothills, plains

Wildlife Value

The fruit is a favorite of birds and a wide variety of other animals.

BWR

Currant, Common or Whitestem -
Ribes inerme

Plant Characteristics
Slender, somewhat spiny branches form a densely rounded shape. The branches change from whitish to reddish brown with peeling bark. Dark green, deeply lobed leaves. The small white, tubular flowers form small, red berries in the late summer.

Mature Height
3' to 4'

Mature Spread
3' to 4'

Flowering Period
Late spring

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Partial shade

Water Needs
Moist

Wetland Indicator
FAC+

Soils
NA

Habitat Characteristics
Found in the canyons of the outer foothills and mountains.

Landscape Use
Use as an understory species on densely wooded, shady streambanks.

Management Concerns
May not be desirable next to high traffic areas because of thorns.

Zone
Foothills

Wildlife Value
Provides food and shelter for a variety of animals.

Currant, Golden -
Ribes aureum

Plant Characteristics
This multi-stemmed shrub forms an erect somewhat irregular-shaped clump. Bright green leaves turn shades of red, yellow, and orange in the fall. The cinnamon-scented, golden, tube-shaped flowers are scattered among the leaves. In the summer small, dark red currants mature and dry on the shrub to form appetizing, raisin-like fruit.

Mature Height
4' to 6'

Mature Spread
5'

Flowering Period
Late spring

Growth Rate
Moderate to fast

Available Plant Forms
Containers

Exposure
Partial shade to sun

Water Needs
Moist to dry

Wetland Indicator
FACW

Soils
Adaptable, prefers well-drained, sandy loams. Tolerates alkaline soils without turning yellow.

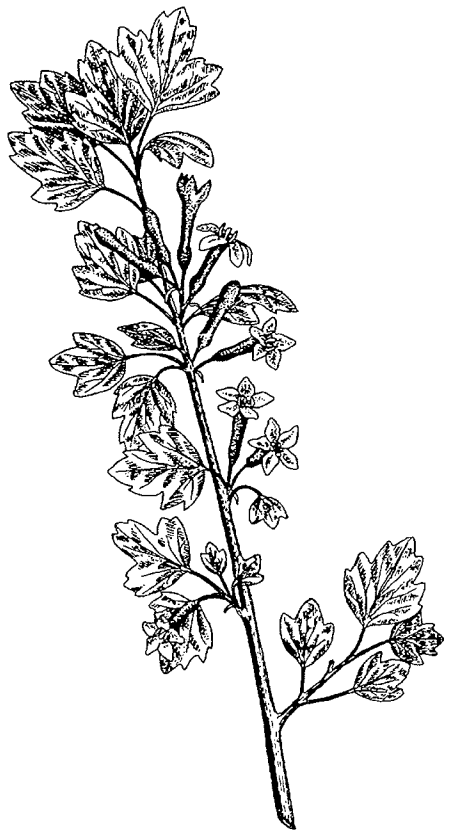
Habitat Characteristics
Commonly found along streams in the lower foothills and plains. Associated with rabbitbrush, Rocky Mountain maple, Saskatoon serviceberry and chokecherry.

Landscape Use
Use as an understory species along streambanks. This beautiful, fragrant shrub would be excellent in moister areas next to public pathways and other highly visual sites.

Management Concerns
None known

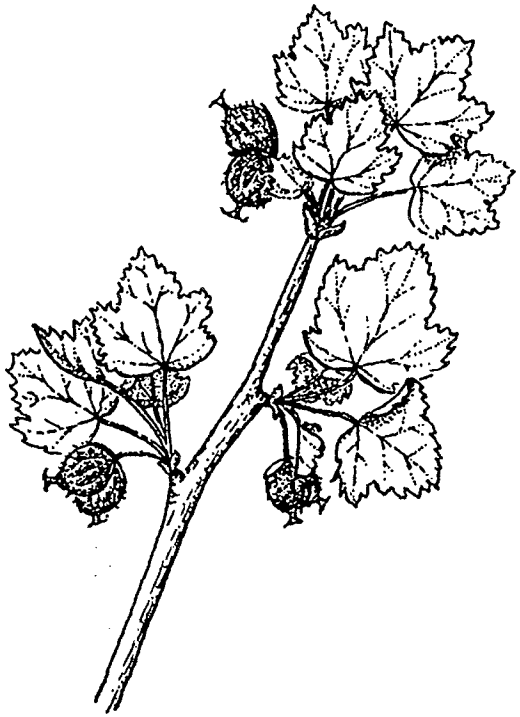
Zone
Foothills, plains

Wildlife Value
Provides food and shelter for a variety of animals



WR

Currant Wax -
Ribes cereum



Plant Characteristics
The dense branches flare outward to form a rounded shrub. The small waxy leaves are grayish-green in color. Clusters of small pinkish, tubular flowers turn into red berries in late summer.

Mature Height
3' to 6'

Mature Spread
3 to 6'

Flowering Period
Spring to summer

Growth Rate
Slow to moderate

Available Plant Forms
Containers, seeds

Exposure
Sun to partial shade

Water Needs
Moderate to low, very low

Wetland Indicator
Upland

Soils
Sand to loam clay

Habitat Characteristics
This shrub prefers drier ground on the upper banks of streams and on hillsides. It is usually found singly or in small clumps.

Landscape Use
Can be planted on the upper banks of riparian areas.

Management Concerns
None known

Zone
Plains, foothills

Wildlife Value
Eaten by birds and small mammals. Rarely browsed by deer.

Dogwood, Redosier -
Cornus stolonifera (Swida sericea)

Plant Characteristics
Broad, round shrub with dark red branches that are especially visible during the winter. White flowers form flat-topped clusters that become white berry-like fruit.

Mature Height
6' to 8'

Mature Spread
8' to 12'

Flowering Period
Late spring to early summer

Growth Rate
Fast

Available Plant Forms
Containers

Exposure
Adaptable

Water Needs
Wet to adaptable

Wetland Indicator
FACW

Soils
Sand to loam

Habitat Characteristics
Commonly found in shaded canyons of the foothills.

Landscape Use
Use as an understory species for cottonwoods and alders along streams or in the moister portions of the Buffer Zone.

Management Concerns
NA

Zone
Foothills

Wildlife Value
Food for mammals and birds

Leadplant, Indigobush -
Amorpha fruticosa

Plant Characteristics
Medium-size shrub with feathery green leaves. Has long spikes of purple pea-like flowers.

Mature Height
6' to 8'

Mature Spread
Up to 15'

Flowering Period
Summer

Growth Rate
Moderate to slow growth

Available Plant Forms
Containers

Exposure
Sun to partial shade

Water Needs
Wet to adaptable. Tolerates irregular flooding

Wetland Indicator
FACW

Soils
Sand to loam; nitrogen fixer. Tolerates alkaline and acidic conditions.

Habitat Characteristics
Frequently found in spreading clumps along streams near the base of the mountains.

Landscape Use
Good for stabilizing stream banks and moist upper areas. Useful as a pioneer species to stimulate the growth of other species because it is a nitrogen fixer.

Management Concerns
Slow growth. Plants may need to be inoculated to grow well.

Zone
Foothills, plains

Wildlife Value
Cover for birds and small mammals. Good forage.

WR BWR

Maple, Rocky Mountain -
Acer glabrum

Plant Characteristics
This small tree or large shrub has smooth, gray trunks with many fine branches that form an irregular oval crown. Clusters of small, yellowish flowers bloom in early spring at the same time when leaves appear. The 3 to 5 lobed, dark green leaves turn a vivid yellow with bright red highlights in the fall. The 2-winged seeds turn green or light red in late summer.

Mature Height
10' to 20'

Mature Spread
10' to 15'

Flowering Period
Early spring

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Sun, partial shade

Water Needs
Adaptable

Wetland Indicator
FAC

Soils
Loam to clay

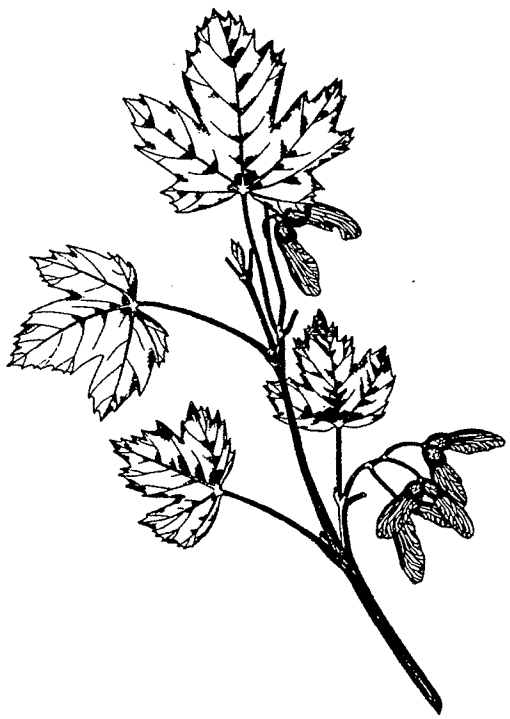
Habitat Characteristics
Prefers cooler north-facing slopes and streambanks.

Landscape Use
Can be planted under large trees to provide vertical complexity.

Management Concerns
None

Zone
Foothills

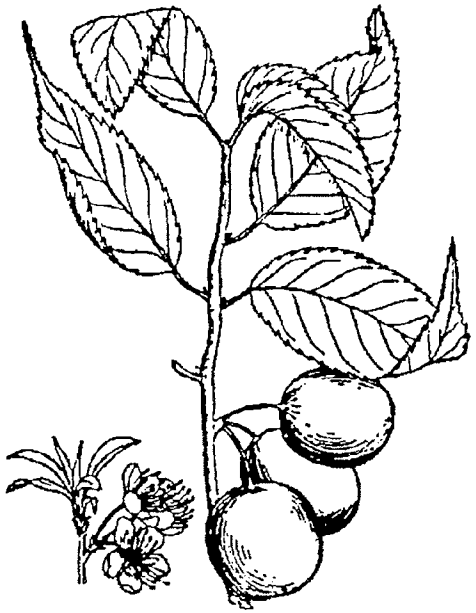
Wildlife Value
Provides shelter for a variety of animals.



WR BWR

Plum, American or Wild

Prunus americana



Plant Characteristics

Broad, rounded shrub or small tree with branches that are sometimes modified to form coarse thorns. Delicate white flowers bloom in the spring just before the leaves appear. The dark green leaves turn a rich yellow in the fall. Small reddish plums with yellow fruit form in the mid to late summer. The fruit is eaten by wildlife and makes excellent jelly.

Mature Height

10' to 20'

Mature Spread

8' to 12'

Flowering Period

Mid to late spring

Growth Rate

Fast

Available Plant Forms

Containers

Exposure

Sun to partial shade

Water Needs

Dry to moist; drought tolerant after establishment

Wetland Indicator

FACU

Soils

Adaptable

Habitat Characteristics

Forms dense thickets from suckers. Occurs on the sides of gulches and intermittent streams.

Landscape Use

Plant on upper banks to provide erosion control and visual appeal as the masses of white flowers provides early spring color.

Management Concerns

May need to be fenced during establishment to protect from deer.

Zone

Foothills, plains

Wildlife Value

Good wildlife value. Provides food for mammals and upland birds, and cover for birds and small mammals.

Rabbitbrush, Rubber -
Chrysothamnus nauseosus

Plant Characteristics
An irregularly rounded shrub with silvery, herbaceous stems and green, leaves. Deeply branched taproots vigorously sucker. Feathery clusters of small, golden flowers form at the end of twigs. The strongly-scented flowers turn into fluffy seed clusters that remain attached through winter into early spring. There are several native subspecies; the two most appropriate and commercially available for this region are: *C.n. nauseosus and C.n. graveolens.*

Mature Height
1' to 6', varies per subspecies

Mature Spread
Variable

Flowering Period
Late summer, fall.

Growth Rate
Establishes easily, spreads rapidly.

Available Plant Forms
Containers, seed

Exposure
Sun

Water Needs
Dry. Drought tolerant, especially after establishment. Tolerates poorly drained soil, but does not grow well in areas of permanent high water tables.

Wetland Indicator
Upland

Soils
Clayey to sandy soils. Occurs on alkaline and salty soils.

Habitat Characteristics
Scattered clumps occur on the dry, grasslands of the plains and foothills. Grows with sagebrush and a wide variety of short to midgrass species. The subspecies *C.n. nauseosus* is common on the eastern plains and foothills. *C.n. graveolens* grows in deep soils and intermittent drainages of the plains.

Landscape Use
Use in dry areas and on south facing slopes, especially in areas with alkaline soils; also can be planted on more moist sites on upper banks. Useful for soil stabilization. The attractive winter form and the late blooming flowers make this an attractive plant in highly visible areas.

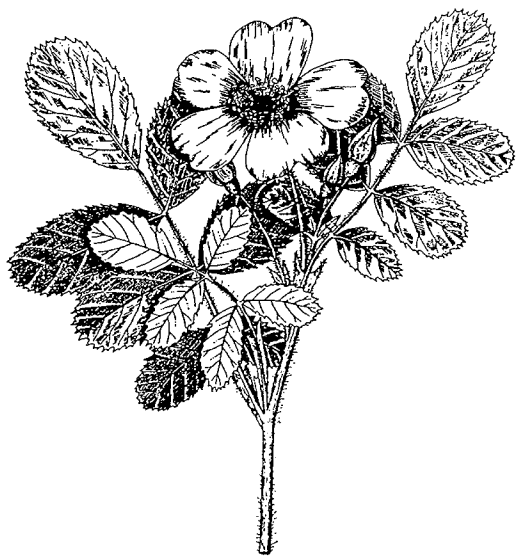
Management Concerns
May attract deer. Can reseed readily. In open space areas, plant only the appropriate subspecies.

Zone
Plains, foothills

Wildlife Value
Good cover for birds and small mammals. Browsed by deer and rabbits. Attracts bees and butterflies

BMG BDG

Rose, Wood's -
Rosa woodsii



Plant Characteristics
This small shrub forms a wide loose bramble. Dark reddish-brown stems bear numerous spines and prickles. Small dark green leaflets. Large pale-pink flowers turn into red rose hips in the late summer and last into the winter.

Mature Height
3' to 6'

Mature Spread
3' to 6'

Flowering Period
Early summer

Growth Rate
Moderate

Available Plant Forms
Containers

Exposure
Sun to partial shade

Water Needs
Adaptable to dry

Wetland Indicator
FACU

Soils
Well drained loamy to sandy

Habitat Characteristics
This highly adaptable shrub grows along the edges of woods, in open swales, and along the upper edges of streams and lakes.

Landscape Use
The beautiful flowers in the spring and bright red rosehips in the fall and winter make this shrub an attractive addition to the edge of riparian areas and along low-lying swales.

Management Concerns
Because of the thorns, may not be desirable in heavily trafficked areas.

Zone
Foothills, plains

Wildlife Value
The rose hips are an important food source for a variety of wildlife.

Sage, Fringed -
Artemisia frigida

Plant Characteristics
Half shrub with annual stems that grow from a woody base. Moderately deep, branched taproots. The stems form a low, spreading shrub. Silvery green, finely dissected leaves form a delicate, feathery shape. Aromatic. Small, indistinct, yellow flowers form a long narrow spike.

Mature Height
6" to 18"

Mature Spread
NA

Flowering Period
Late summer

Growth Rate
Can germinate quickly.

Available Plant Forms
Seeds

Exposure
Sun to partial shade

Water Needs
Adaptable. Good drought tolerance for both seedlings and mature plants

Wetland Indicator
Upland

Soils
Wide range from loams to thin, rocky, and gravely soils.

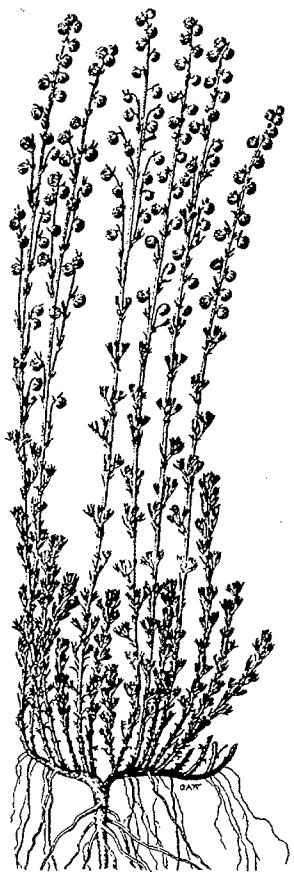
Habitat Characteristics
Common on open exposed sites and under larger shrubs in the dry plains and foothills. Occurs with blue grama, needle-and-thread, and mountain muhly.

Landscape Use
Grow on dry, exposed slopes, level plains, and rocky areas. Useful as a pioneer species for quick establishment.

Management Concerns
May attract deer. Plant seeds on the surface because light helps germination. Plant in late fall or early spring when reliable surface moisture is present. This quick-growing species has a tendency to overtake an area.

Zone
Plains, foothills

Wildlife Value
Winter forage for deer.



Sagebrush, Prairie -
Artemesia ludoviciana

Plant Characteristics
Rhizomatous half shrub with herbaceous stems growing from a woody base. These slender stems form a spreading, rounded shrub. Slender grayish-green leaves. Insignificant, muted yellow flowers grow in a narrow cluster. Aromatic.

Mature Height
1' to 4'

Mature Spread
2' to 3'

Flowering Period
Midsummer

Growth Rate
Establishes easily.

Available Plant Forms
Plants, seeds.

Exposure
Sun

Water Needs
Dry to slightly moist

Wetland Indicator
FACU-

Soils
Loams to sandy.

Habitat Characteristics
Occurs on roadcuts and other steep slopes in the mountains and plains.

Landscape Use
Use as a pioneer species on poor quality soils as it establishes quickly and easily. Plant on the upper banks, especially in steep areas.

Management Concerns
NA

Zone
Foothills, plains

Wildlife Value
Fair forage for wildlife

Sagebrush, Silver -
Artemesia cana (Seriphidium canum)

Plant Characteristics
Small, rounded shrub grows from deep, well branched roots. Stiff, silvery branches contain silvery-gray linear leaves. Small, insignificant, pale yellow flowers grow in a narrow cluster. Very aromatic.

Mature Height
2' to 5'

Mature Spread
2'

Flowering Period
Midsummer

Growth Rate
Germinates rapidly. Fair seedling vigor.

Available Plant Forms
Plants, seeds

Exposure
Sun

Water Needs
Moist. Tolerates periodical flooding. Drought tolerant

Wetland Indicator
FACU

Soils
Loams to sands, not on dense clay

Habitat Characteristics
Occurs on the edge of drainage areas. Occurs with western wheatgrass, sedges, and rushes.

Landscape Use
Use for stabilizing banks of streambeds and in other moist locations. Useful in areas where the moisture content of the soils varies through the seasons.

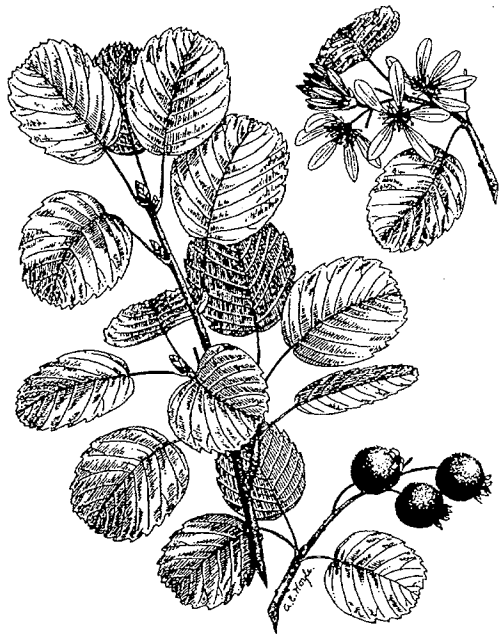
Management Concerns
Best to use local sources for seeds.

Zone
Foothills, plains

Wildlife Value
Winter forage for wildlife such as deer.

BMG

Serviceberry, Saskatoon -
Amelanchier alnifolia



Plant Characteristics
Small tree or large shrub of upright arching form. Small, fragrant, white flowers form clusters on the branches. The dark green leaves turn yellow to soft red in the fall. Black edible fruit appears in mid-summer.

Mature Height
6' to 12'

Mature Spread
6' to 12'

Flowering Period
Mid-spring

Growth Rate
Moderate growth rate

Available Plant Forms
Seeds, root cuttings, or transplants

Exposure
Sun to filtered shade

Water Needs
Dry to moist. May require watering during dry spells until well established.

Wetland Indicator
FACU-

Soils
Best on medium to clayey soils, poorly tolerant of salty soils. Will tolerate alkaline clay soils.

Habitat Characteristics
Grows in clumps from the plains to the mountains along streambanks, in moist meadows and on dry mountain slopes. Associated with rabbitbrush, golden currant, and chokecherry.

Landscape Use
Use in a naturalistic setting along drainages.

Management Concerns
Palatable to deer. Suckers readily; subject to insect infestation. Not particularly tolerant of pollution.

Zone
Foothills, plains

Wildlife Value
Valuable wildlife forage. The fruit is readily eaten by birds. Deer and elk browse the foliage.

Snowberry, Western or Wolfberry -
Symphoricarpos occidentalis

Plant Characteristics
Pairs of thick, oblong leaves grow on the stems. Small, pink, tubular flowers form rather dense clusters in the axis of the stem. Later, they form round, greenish-white fruit.

Mature Height
1' to 3'

Mature Spread
5'

Flowering Period
Summer

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Sun to shade

Water Needs
Dry to moist. Occurs in areas of intermittent drainages.

Wetland Indicator
Not rated

Soils
NA

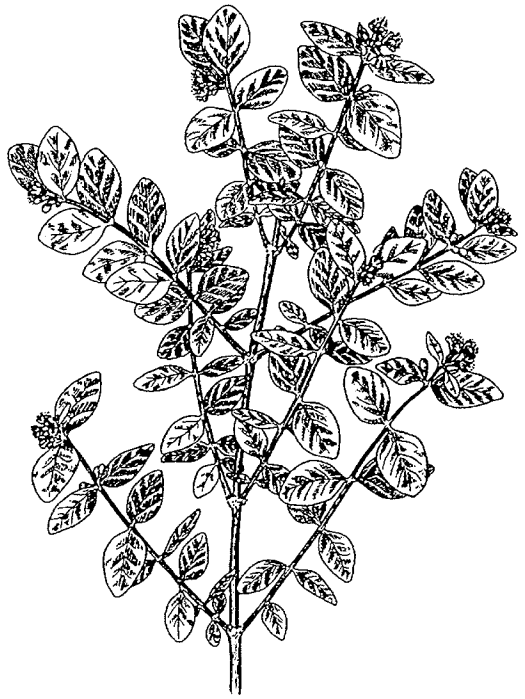
Habitat Characteristics
Forms dense colonies in grassy swales of the mountains and plains. It also occurs on upper banks of stream channels.

Landscape Use
Snowberry is a good shrub to plant in masses across the bottom of occasionally wet drainages and as a low understory in riparian areas.

Management Concerns
NA

Zone
Plains, foothills

Wildlife Value
Shelter for birds and small mammals



Snowberry, White -
Symphoricarpos albus

Plant Characteristics
This shrub has arching branches with oval bluish-green leaves. Small, urn-shaped white flowers have a pinkish overtone. The snow white, roundish berries stay on the branches into the winter.

Mature Height
3' to 4'

Mature Spread
3' to 5'

Flowering Period
Early summer

Growth Rate
Fast to moderate

Available Plant Forms
Containers

Exposure
Sun to filtered shade

Water Needs
Adaptable to dry

Wetland Indicator
FACU

Soils
Adaptable

Habitat Characteristics
This shrub can be planted under trees in foothills riparian areas. It frequently occurs along cool, forested streams in the mountains. Usually this snowberry occurs singly and does not form large masses.

Landscape Use
Useful as an understory shrub on the upper banks of wooded drainages.

Management Concerns
NA

Zone
Foothills

Wildlife Value
Attracts birds

Sumac, Skunkbush -
Rhus trilobata (aromatica ssp. trilobata)

Plant Characteristics
Loosely spreading branches forms a wide rounded shape. Deep, many branched roots with spreading rhizomes. Glossy dark green leaves with three lobes turn various shades of yellows and reds. The stems and leaves have a slight skunk-like odor. The cluster of small yellow flowers bloom before the leaves appear in the spring. Orangish red fruit matures in late summer to fall. The edible fruit is used to make a lemonade-like drink, and Native Americans use it to flavor pemmican.

Mature Height
2' to 6'

Mature Spread
NA

Flowering Period
Spring

Growth Rate
Slow stand development. Develops faster from transplants.

Available Plant Forms
Plants, seeds.

Exposure
Full sunlight to some tolerance of partial shade.

Water Needs
Well-drained soils. Does not tolerate saturated soils. Moderate drought tolerance.

Wetland Indicator
NI

Soils
Adaptable, thin rocky soils to sandy areas.

Habitat Characteristics
Forms thickets on dry, rocky, south-facing slopes in the foothills to sandhills on the plains. Associated with mountain mahoganies, juniper, and rabbitbrush.

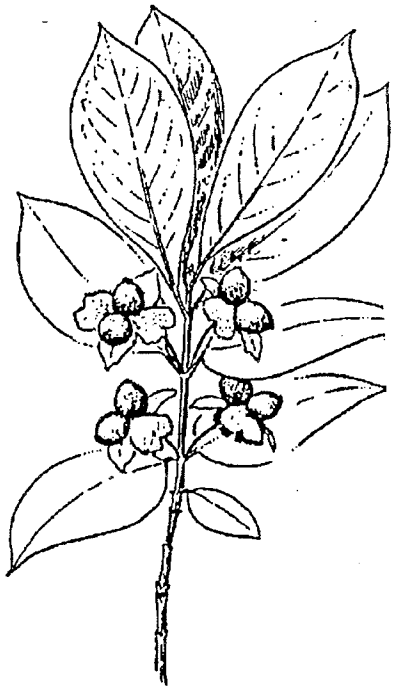
Landscape Use
Plant on upper banks in open areas especially where susceptible to erosion. Use as a sand trap barrier in extremely sandy soils. Can be used for barrier plantings.

Management Concerns
Best to transplant small plants or stem and root cuttings. Rodents may girdle young plants. This species may not be appropriate next to highly trafficked areas because of the slight malodorous smell of the leaves.

Zone
Plains, foothills.

Wildlife Value
Cover for birds and mammals. Low to fair palatability to deer.

Twinberry or Bush Honeysuckle -
Distegia (Lonicera) involucrata



Plant Characteristics
Erect branches form an upright, oval-shaped shrub. Bright green leaves. Twin creamy yellow, tubular flowers are surrounded by a cup of fused leaves or bracts. As the flowers mature to a pair of black berries, the bracts enlarge and turn deep red.

Mature Height
3' to 6'

Mature Spread
3' to 6'

Flowering Period
Late spring to early summer

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Filtered shade to shade

Water Needs
Moist to adaptable. After establishment, tolerates drier conditions

Wetland Indicator
FAC

Soils
NA

Habitat Characteristics
Commonly found along mountain streams where it suckers and forms large thickets.

Landscape Use
This attractive shrub is good as an understory species along streams and in moist regions of the upper buffer zone.

Management Concerns
The fruits are considered poisonous to humans.

Zone
Foothills

Wildlife Value
Food for birds; cover for birds and small mammals.

WR BWR

Willow, Sandbar or Coyote -
Salix exigua

Plant Characteristics
Long slender branches form an upright, irregularly shaped shrub. New branches are golden yellow changing to light gray as they mature. Fuzzy yellow-green catkins form in early spring before the linear grayish-green leaves appear.

Mature Height
6' to 12'

Mature Spread
4' to 8'

Flowering Period
Early spring

Growth Rate
Rapid

Available Plant Forms
Cuttings (see BMPs), containers

Exposure
Sun

Water Needs
Wet. Requires seasonal flooding. After establishment, can tolerate seasonal drying as long as roots have had a chance to grow to the water table. May need supplemental watering during establishment.

Wetland Indicator
OBL

Soils
Rocky to sandy soils

Habitat Characteristics
This readily suckering shrub forms large colonies on low-lying sandbars, riverbanks, and along lake margins. It is extremely common in the valleys of the outer foothills and plains.

Landscape Use
This species is very tolerant of occasional flooding and is excellent for bank stabilization in drainages.

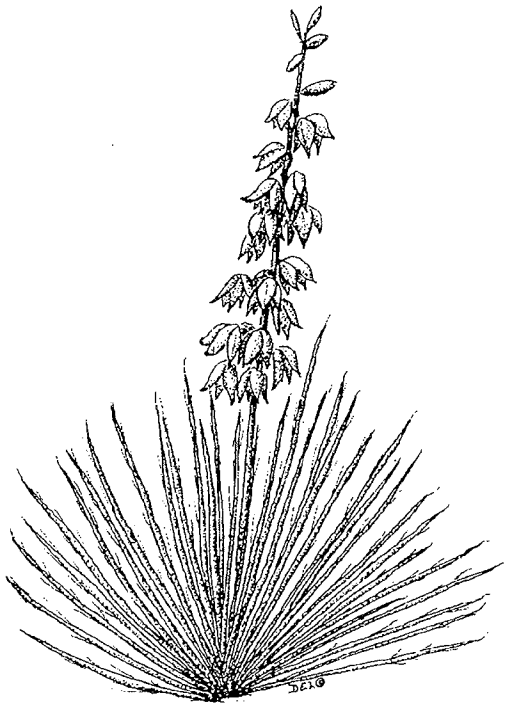
Management Concerns
Plant cutting in early spring before the buds open. For both cuttings and containers, plant before spring runoff to meet the species' water requirements. However, this timing may not work in areas of high volume runoff (such as Boulder Creek) where newly planted shrubs may wash away. In these areas, cuttings may be stored in water in a cool location until high water subsides. If runoff is inadequate or later than anticipated, supplemental watering will be needed until the roots get established.

Zone
Foothills, plains

Wildlife Value
Shelter for a variety of animals and food for deer.

WR WHW

Yucca or Soapweed -
Yucca glauca



Plant Characteristics
Rounded clump of sword-shaped, evergreen leaves that are bluish green in color. A tall spike of large, creamy white flowers rise several feet above the leaves. The flowers open more at night than in the day because they depend on the nocturnal yucca moth for pollination. The fruit is a large, dry capsule.

Mature Height
2' to 4'

Mature Spread
2; to 6'

Flowering Period
Late spring

Growth Rate
Medium life span

Available Plant Forms
Plants, seeds

Exposure
Sun

Water Needs
Dry.

Wetland Indicator
Upland

Soils
Adaptable to sandy, fast draining

Habitat Characteristics
Occurs in rocky areas and on dry slopes throughout the plains. Becomes very abundant in overgrazed areas because livestock avoids this needle-sharp plant.

Landscape Use
Scatter on dry, south-facing slopes especially where it is difficult to establish other vegetation. Useful as an accent plant especially in the spring. Can be planted in rock gardens.

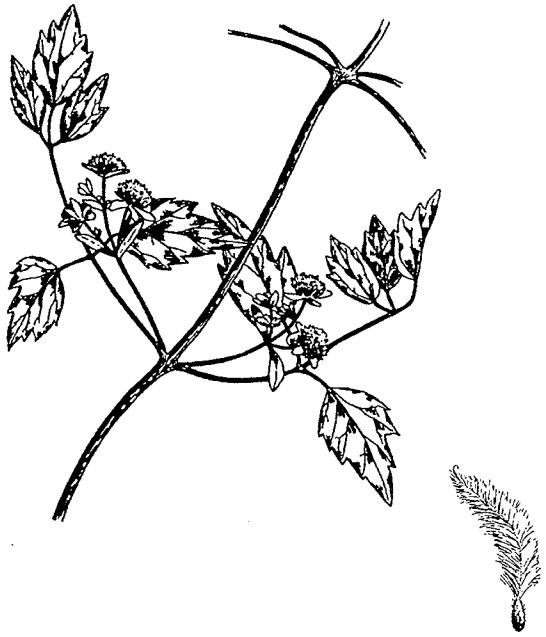
Management Concerns
The sharp-tipped leaves make this an undesirable plant near highly trafficked areas.

Zone
Plains

Wildlife Value
Used by yucca moths. Avoided by most herbivores.

Vines

Virgins Bower, Western -
Clematis ligusticifolia



Plant Characteristics
Somewhat woody climbing vine with light green leaves. The clusters of small white flowers become large masses of feathery plumed seeds.

Mature Length
Up to 20'

Flowering Period
Early summer

Exposure
Sun to partial shade

Water Needs
Moist to dry

Soils
NA

Wetland Indicator
FACU

Available Plant Forms
Container

Growth Rate
NA

Habitat
Commonly found in thick clumps over trees and fences near streams and on hillsides.

Landscape Use: Useful as a naturalistic fence cover.

Zone
Foothills, plains

Wildlife Value
Shelter for songbirds, nectar for butterflies.

Management Concerns
May aggressively cover trees and shrubs.

WR BWR

Grape, River -
Vitis riparia

Plant Characteristics
Woody climbing vine with coiling tendrils. Large maple-like leaves. The inconspicuous flowers mature into sweet white grapes.

Mature Length
Various

Flowering Period
NA

Exposure
Sun to partial shade

Water Needs
Adaptable to moist

Soils
NA

Wetland Indicator
FACW

Available Plant Forms
Container

Growth Rate
NA

Habitat
Grows in wooded canyons of the outer foothills.

Landscape Use
Use as a ground cover or as a climbing vine in moist woody drainages.

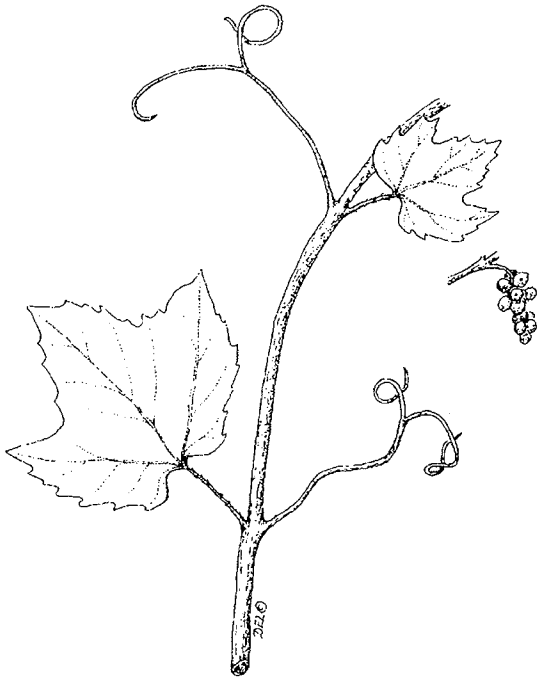
Zone
Foothills

Wildlife Value
Food for a variety of animals.

Management Concerns
NA

Available Plant Forms
Container

Growth Rate
NA



Grass and Grass-Like Plants

Alkali Grass -
Puccinellia nuttalliana (airoides)

Plant Characteristics
Tufted grass with erect stems. The spikelets form an open pyramidal-shaped panicle.

Mature Height
6" to 12"

Flowering Period
Warm, cool

Growth Rate
Medium

Available Plant Forms
Containers, seeds

Exposure
Sun

Water Needs
Temporary flooding

Wetland Indicator
OBL

Soils
Highly tolerant of alkaline soils

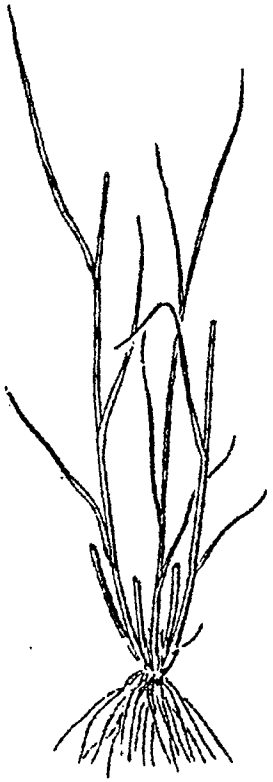
Habitat Characteristics
Occurs on saline and alkaline flats at the edge of reservoirs from moist soils to sometimes within standing water.

Landscape Use
Useful in stabilizing shorelines and marshes. Provides cover in alkaline flats.

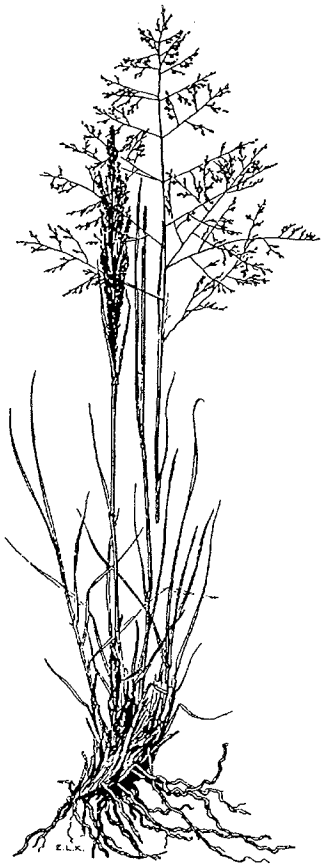
Management Concerns
NA

Zone
Plains

Wildlife Value
Waterfowl cover



Alkali Sacaton -
Sporobolus airoides



Plant Characteristics
Grows in large tufts from densely fibrous roots to form an open, hummocky sod. The spikelets form an open, pyramidal shaped cluster. Lower branches of the flowering cluster sometimes enclosed in the sheath.

Mature Height
Midgrass 1' to 3'

Flowering Period
Warm season

Growth Rate
Slow to establish unless irrigated. Moderate germination and growth rate.

Available Plant Forms
Seed

Exposure
Sun to some shade tolerance

Water Needs
Moist. Tolerates poor drainage and shallow water table. Survives in drought; although plant cover is reduced.

Wetland Indicator
FAC

Soils
Sandy to clayey soils. Highly tolerant of salty or alkaline soils.

Habitat Characteristics
Usually found in alkaline swales and other wet meadows. Associated with inland saltgrass and western wheatgrass. Maintains a thick sod layer on very salty soils.

Landscape Use
Plant in drainages with alkaline soils. Either plant in a seed mix or in pure stands. In dense patches, the airy spikelets give the landscape a beautiful, smoky hue.

Management Concerns
Slow to establish unless irrigated. Can irrigate site first, plant, then cover with mulch, irrigate every 5 days until the seedlings establish. If irrigation is not possible, can plant in pits or furrows to concentrate moisture. Plant in spring. After establishment, may be grazed in the spring.

Zone
Plains

Wildlife Value
Provides food and cover for waterfowl and other birds.

WR WHW BWR BMG

Arrowweed -
Triglochin maritima

Plant Characteristics
Rhizomatous. Slender flowering stem rises from a cluster of linear leaves. Small yellow flowers form a narrow spike at the top of the stem.

Mature Height
12" to 8"

Flowering Period
Summer

Growth Rate
Slow

Available Plant Forms
Plants, seeds

Exposure
Sun

Water Needs
Seasonally flooded.

Wetland Indicator
OBL

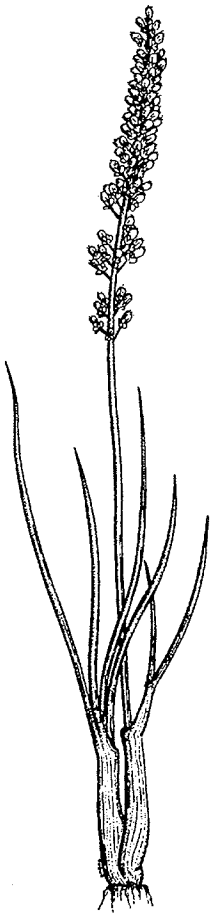
Soils
Moderately tolerant of alkaline soils

Habitat Characteristics
Occurs on alkaline flats and wet meadows.

Landscape Use
Delicate looking plant can be grown among sedges and grasses on wet sites including alkaline.

Management Concerns
Slow growing

Zone
Plains



Bluestem, Big -
Andropogon gerardii

Plant Characteristics
Bunch sod-forming grass. Broad, flat leaves are green to dark green and turn a reddish-purple at maturity. The three-pronged spikelet looks like a turkey foot.

Mature Height
Tall-grass, 3' to 6'

Flowering Period
Warm Season. Starts growth in mid-late spring and matures in early fall.

Growth Rate
Develops slowly and does not usually establish stands until the second year. Although, growth is relatively rapid for a warm season grass. Long-lived.

Available Plant Forms
Seeds

Exposure
Sun to partial shade

Water Needs
Moist to wet. Moderately tolerant of high water tables and short-term flooding. Prefers well-drained soils.

Wetland Indicator
FAC-

Soils
Prefers deep fertile silt and clay loams. Moderately salt tolerant.

Habitat Characteristics
This is the dominant species of the tallgrass prairie in the midwestern states. In Colorado, it occurs in flood plains and drainages which receive more moisture than the surrounding prairie. Associated with switchgrass, yellow Indiangrass, and little bluestem.

Landscape Use
Use in drainages and subirrigated meadows that receive adequate moisture but do not have a permanently high water table. Can be used as part of a mix in the drier portions of wetlands. Useful as an accent plant because of its large size and reddish leaves in the summer and fall.

Management Concerns
As this grass does not establish quickly, it needs to be planted with faster growing species in areas where erosion control is needed. Weed control , such as mowing or carefully controlled grazing needed in newly seeded areas. Seed in spring.

Zone
Plains

Wildlife Value
Highly palatable to wildlife

WR WHW BWR BMG

Bluestem, Little -
Schizachyrium (Andropogon) scoparium

Plant Characteristics
Perennial bunchgrass, occasionally with short rhizomes. Deep fibrous root system. The light blue-green leaves turn an attractive reddish brown when mature. Small, feathery spikelets are scattered along the upper stem.

Mature Height
Mid grass; 1' to 4' tall

Flowering Period
Warm season, new growth in the spring, flowers in late summer and matures in the fall.

Growth Rate
Low germination rate but also spread by tillers

Available Plant Forms
Seeds, containers

Exposure
Sun to partial shade.

Water Needs
More drought tolerant than big bluestem. Not very tolerant of flooding and high water.

Wetland Indicator
FACU

Soils
Adaptable. Sand to clay. Usually found on coarse textured well-drained soils. Not salt tolerant.

Habitat Characteristics
Widespread species of the plains. Occurs with big bluestem, sideoats grama, and prairie dropseed on clayey, mesic sites. On sandier mesic sites, grows with prairie sandreed and sand bluestem. Semi-sod former.

Landscape Use
Useful for erosion control on a variety of soils including sand. Use on the upper banks of drainages and swales that receive more moisture than the surrounding area but are not saturated for any period of time. Also can be planted in gravely outwashes. Attractive reddish color in the late summer and fall makes it a good accent plant.

Management Concerns
Need to mulch on disturbed sites. Weeds need to be controlled in new seedlings. Seed in spring.

Zone
Plains

Wildlife Value
Fairly palatable to deer.

Buffalograss -
Buchloe dactyloides

Plant Characteristics
Buffalograss is a sod-forming, turf grass that spreads by stolons. Deep and widespread root system. It has wiry, blue or grayish-green leaves that turn a goldish color in the fall and winter. Separate male and female plants.

Mature Height
Short grass. 4" to 8"

Flowering Period
Warm season. Starts to green up in late spring and goes dormant in the fall.

Growth Rate
Slow to establish in dry areas. Fast-spreading. Long-lived.

Available Plant Forms
Seed, sod, plugs.

Exposure
Sun

Water Needs
Low 10" to 15" of annual rain with a small amount of additional water for turf areas.

Wetland Indicator
Upland

Soils
Prefers silt or clay, needs more moisture on sandy soils. Tolerant of slightly alkaline soil.

Habitat Characteristics
Along with blue grama, this is the dominant species of the short grass prairie especially in the eastern part of Colorado. Not as common closer to the foothills.

Landscape Use
Use in dry areas, especially on clay soils. Can be grown as a turf in more formal areas, alone or mixed with blue grama. Useful, especially with other grasses, for soil stabilization in more natural areas.

Management Concerns
Short green season. Does not tolerate excessive foot traffic, water, fertilizer, shades, and weeds. Seeds will not germinate until the soils are warm. Needs irrigation for faster establishment. Seed in spring. Mowing or grazing will stimulate growth and control weeds.

Zone
Plains

Wildlife Value
Palatable to wildlife

BWR BDG

Bulrush, Alkali -

Scirpus maritimus (Bolboschoenus maritimus ssp. paludosus)

Plant Characteristics
Rhizomatous, sod forming. Stout, triangular stems. Three long, leafy bracts cluster under the large, football shaped spikelets.

Mature Height
2' to 3'

Flowering Period
NA

Growth Rate
Medium

Available Plant Forms
Bare root, containers, seeds

Exposure
Sun

Water Needs
Muddy to 6" standing water

Wetland Indicator
OBL

Soils
Highly tolerant of saline and alkaline soils.

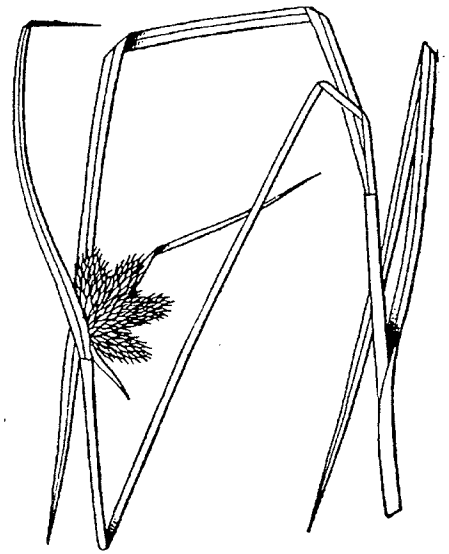
Habitat Characteristics
Occurs near ponds, lakes or in marshes with alkaline soils.

Landscape Use
Plant in open areas at the edge of standing water. These areas would range from muddy to shallowly inundated. Especially useful in alkaline and salty areas. Useful for wildlife habitat.

Management Concerns
May be difficult to grow from seeds.

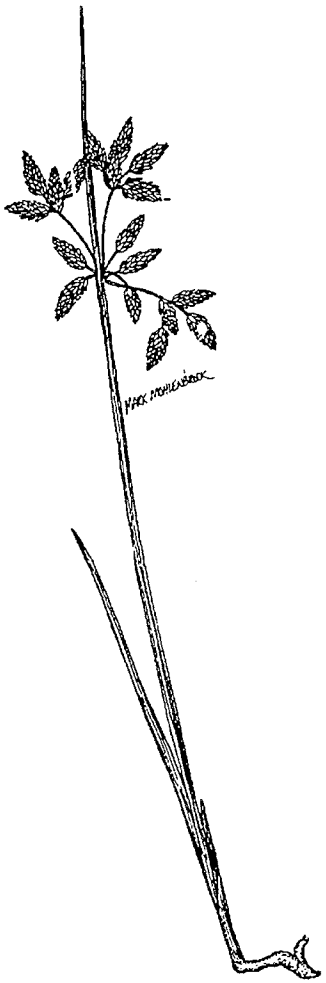
Zone
Plains, foothills

Wildlife Value
Provides food and cover for waterfowl and shorebirds.



WHW WSW

Bulrush, Hard-stem -
Scirpus acutus (Schoenoplectus lacustris ssp. acutus)



Plant Characteristics
Tall, dark green rounded stems grow in thick patches from rhizomes. Grayish-brown spikelets grow in stiff-branched clusters.

Mature Height
2' to 4'

Flowering Period
NA

Growth Rate
Rapid.

Available Plant Forms
Containers

Exposure
Sun

Water Needs
Muddy to 3' of standing water.

Wetland Indicator
OBL

Soils
Loams to clay. Moderately tolerant of saline conditions.

Habitat Characteristics
Found on the muddy to inundated shorelines of ponds and slower moving streams on the plains into the mountains.

Landscape Use
Use in open areas along the shores of ponds in areas to help stabilize the shoreline. Plant in areas with water levels from 3' permanently inundated to the shorelines where the water level fluctuates and the area is periodically only muddy. Useful for wildlife habitat.

Management Concerns
May be difficult to grow from seeds.

Zone
Plains, foothills

Wildlife Value
Food and cover for waterfowl and small mammals.

WHW WSW

Bulrush, Small fruit -
Scirpus microcarpus

Plant Characteristics
Rhizomatous. Medium tall stems with broad leaves. Spikelets can occur at the end of the stem in a cluster of leaf-like bracts.

Mature Height
3'

Flowering Period
NA

Growth Rate
Medium

Available Plant Forms
Bare root, containers

Exposure
Sun

Water Needs
Muddy to 6" standing water

Wetland Indicator
OBL

Soils:

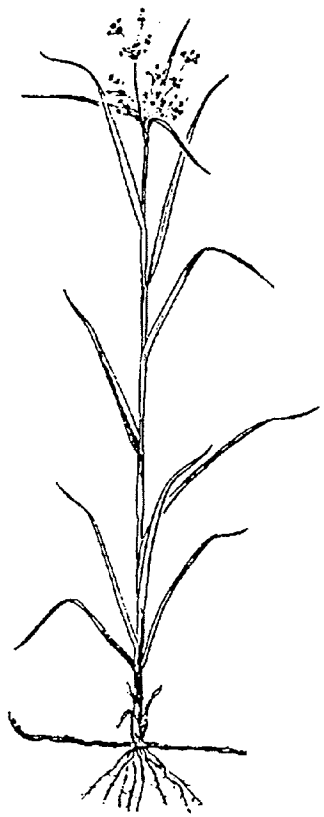
Habitat Characteristics
Grows along the wet shoreline of ponds and ditches, and in marshes from the plains to the mountains.

Landscape Use
Use in open areas at the very edge of the shoreline where there is less than 6" of standing water.

Management Concerns
NA

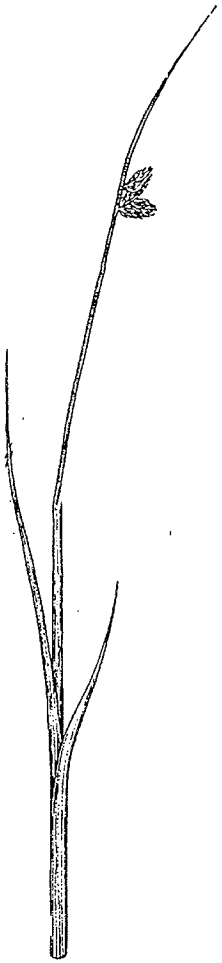
Zone
Plains, foothills.

Wildlife Value
Cover for waterfowl.



WHW WSW

Bulrush, Threesquare or Olney Threesquare - *Scirpus americanus (Schoenoplectus pungens)*



Plant Characteristics

Loosely clustered to scattered plant growing from rhizomes. The stem is sharply triangular. Small cluster of brown, football shaped spikelets seem to emerge from the side of the stem near the top.

Mature Height

2' to 4'

Flowering Period

NA

Growth Rate

Rapid

Available Plant Forms

Plants

Exposure

Sun to partial shade

Water Needs

From seasonally saturated to 6" deep standing water. Drought tolerant

Wetland Indicator

OBL

Soils

Tolerant of alkaline and saline soils.

Habitat Characteristics

Variable plant that grows within marshes and wet meadows on alkaline and other soils. Can grow on the edges of these areas where it is seasonally dry to wetter portions of these wetlands. Similar to the conditions for Baltic rush but slightly wetter.

Landscape Use

Grow in areas of moderately fluctuating water tables near the edge of marshes, wet meadows, and ponds.

Management Concerns

Not tolerant of pollution.

Zone

Plains, foothills

Wildlife Value

Cover for waterfowl and small mammals.

Bur-reed -
Sparganium eurycarpum

Plant Characteristics
Balls of flowers attached to the zig-zagging stem with narrow leaves.

Mature Height
2' to 4'

Flowering Period
NA

Growth Rate
Rapid

Available Plant Forms
Bare root, containers

Exposure
Sun

Water Needs
Standing water 6" to 12"

Wetland Indicator
OBL

Soils
Medium salt tolerant

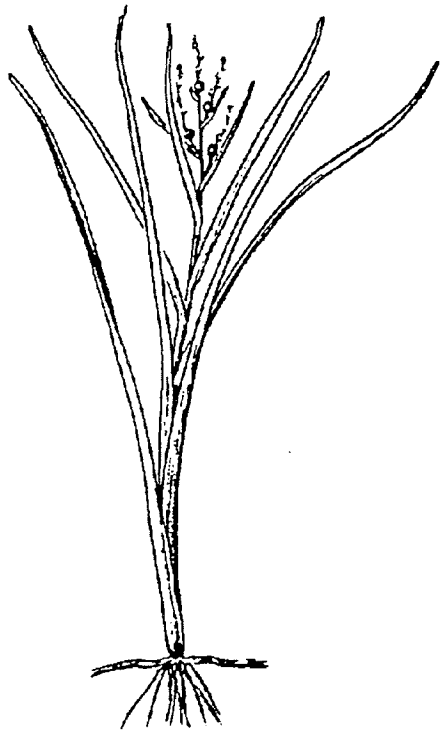
Habitat Characteristics
Margins of ponds. Usually grows with bulrushes. In deeper waters, the leaves get very long and the plants do not flower.

Landscape Use
Plant in open areas at the shallow end of the ponds. Useful for filtering moderate amounts of pollutants. Clumps of bur-reed and bulrushes can be intermixed with clumps of shorter species such as arrowhead for an attractive effect.

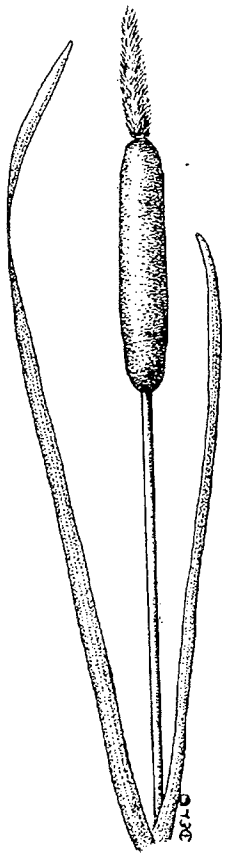
Management Concerns
NA

Zone
Plains, foothills

Wildlife Value
Food and cover for waterfowl



Cattail, Broadleaf -
Typha latifolia



Plant Characteristics
Tall, flat stems grow in upright clusters from rhizomes. At the end of the long stem, brown sausage-shaped cluster of male flowers with the narrower spikes of female flowers above.

Mature Height
Up to 6'

Flowering Period
Exposure: Sun

Growth Rate
Rapid.

Available Plant Forms
Bare root, containers, seeds.

Water Needs
From saturated, muddy soils to 12" of standing water.

Wetland Indicator
OBL

Soils
Highly tolerant of saline soils. Moderately tolerant of acidic soils.

Habitat Characteristics
Cattails form dense marshes in areas of saturated soils and shallow standing water. These stands can just contain cattails or be mixed with patches of bulrushes. Surrounding these marshes may be swaths of spikerush, Baltic rush, sedges and other marshy species. Often found in urban drainage ponds because it can tolerate poor water quality.

Landscape Use
Use sparingly in stormwater detention ponds, alkaline ponds, and other areas of saturated soils that receive poor quality runoff. Good wildlife habitat.

Management Concerns
This can be an invasive species and crowd out other species planted in the marsh. Cattails may not need to be planted if there is a nearby seed source. This very tall species may not be desirable in areas where visibility is important.

Zone
Plains, foothills.

Wildlife Value
Important breading ground for blackbirds, marsh wrens, and other birds. Food source for waterfowl and mammals.

WHW WSW

Cordgrass, Prairie -
Spartina pectinata

Plant Characteristics
Large rhizomatous grasses forms a dense sod. The long arching leaves have sharp edges. A series of brush-like spikelets are clustered at the end of the stem.

Mature Height
3' to 5'

Flowering Period
Warm season.

Growth Rate
Rapid

Available Plant Forms
Container, seed

Exposure
Full sun

Water Needs
Seasonally flooded

Wetland Indicator
FACW/OBL

Soils
Moderately alkaline tolerant

Habitat Characteristics
Moist to wet meadows, marshes, streambanks and pond shores. This sod-forming grass grows in dense patches to the exclusion of other grasses.

Landscape Use
Plant in large patches in wet meadows and in unshaded areas around the shores of ponds and streams to help stabilize the soil. Useful in alkaline soils.

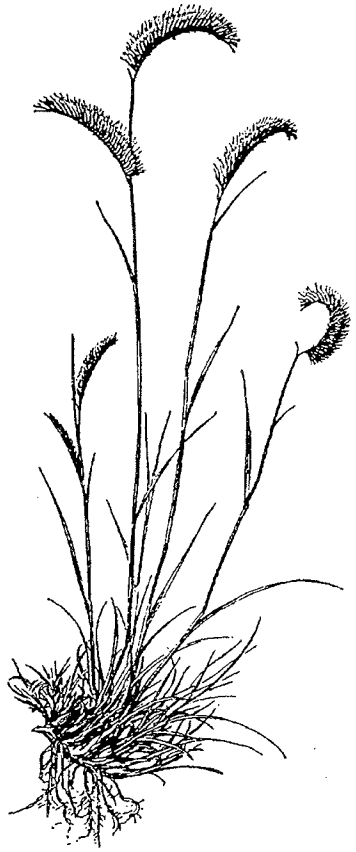
Management Concerns
Invasive, tends to dominate the sites. May be difficult to establish from seed. Plant seed in spring.

Zone
Foothills, plains

Wildlife Value
Cover for birds and small mammals

WR WHW

Grama, blue -
Bouteloua gracilis (Chondrosum gracile)



Plant Characteristics
Densely tufted, sod-forming bunchgrass. Blue grama has soft, short, blue-green leaves that rise from a base of old dried leaves. The flag-like spikelet has a characteristic eye-brow shape.

Mature Height
Short grass; 6" to 24"

Flowering Period
Warm season. Starts turning green in late spring and becomes dormant in the fall.

Growth Rate
Establishes poorly to fairly easily; long-lived.

Available Plant Forms
Seeds , sod, containers

Exposure
Sun

Water Needs
Dry, very drought tolerant and will revive even after extreme dry periods.

Wetland Indicator
UPL

Soils
Clay to loams and to a lesser extent sandy soils. Fairly salt tolerant. Common on alkaline soils.

Habitat Characteristics
Along with buffalograss, this is the dominant species of the shortgrass prairie. Toward the foothills, buffalograss looses it's importance and blue grama becomes the most prominent species. Other associates species include western wheatgrass and needle-and-thread. On sandier sites, it occurs with prairie sandreed and sand sagebrush.

Landscape Use
Use in dry to very dry areas with clay, and to a lesser extent sandy, soils. Useful for binding soils, especially in steep areas. Can be used as a turf grass in more formal settings either alone or mixed with buffalograss. Useful for binding soils, especially in steep areas. Can be used as a turf grass in more formal settings either alone or mixed with buffalograss.

Management Concerns
Intolerant of shade and high foot traffic. Slow to establish from seeds. Plant seed in spring in moist ground. About 3 weeks after germination, blue grama needs moisture, either from rain or irrigation. Needs mowing or grazing to control weeds and stimulate growth of blue grama.

Zone
Plains, foothills

Wildlife Value
Good forage

BWR BMG BDG

Grama, Sideoats -
Bouteluoa curtependula

Plant Characteristics
This bunchgrass is semi sod-forming with short rhizomes. Medium-wide, bluish green leaves turn brown in the fall. Purplish, one-sided spikelets grow on a long stem. Later in the summer small bright orange anthers appear amidst the spikelets.

Mature Height
Midgrass, 1' to 2'

Flowering Period
Warm season.

Growth Rate
Easy to grow from seed if planted in late summer, 2 months before the first frost.

Available Plant Forms
Seeds

Exposure
Sun

Water Needs
Moderately drought resistant; although not as much as blue grama.

Wetland Indicator
Upland

Soils
Wide range from sandy to clayey soils. Does not tolerate loose sands and dense clays well.

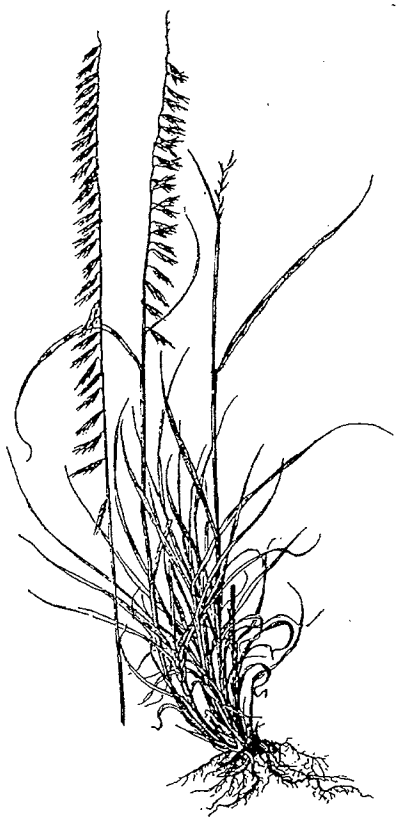
Plant Characteristics
Occurs in the short to mixed grass prairies of Colorado. Associated with blue grama and little bluestem.

Landscape Use
Very hardy. Useful for erosion control in moderately dry soils, especially with other grasses. Can be used as an accent plant either alone or with other species. Provides a tall ground cover.

Management Concerns
Slower growing. Needs mowing and other weed control. Plant seeds in spring.

Zone
Plains, foothills

Wildlife Value
Highly palatable in spring and summer



BWR BMG BDG

Indiangrass, Yellow -
Sorghastrum nutans (avenaceum)

Plant Characteristics
Sod-forming bunchgrass from short rhizomes. Tall leafy stems. Spikelets cluster in a dense golden brown spike.

Mature Height
Tall grass, 3' to 5'

Flowering Period
Warm season. Starts to green in late spring and flowers in late summer or fall.

Growth Rate
Establish relatively quickly.

Available Plant Forms
Seeds; plant in early spring

Exposure
Sun, moderate shade tolerance.

Water Needs:
Moist. Tolerates periodic inundation

Wetland Indicator
FACU

Soils
Deep soils of heavy clays to coarse sands. Tolerate moderate salinity and acidity.

Habitat Characteristics
Grows sporadically on the plains of Colorado in tall grass prairie stands in flood plains and on outwash mesas with enough moisture to sustain the plant. Associated with big and little bluestem, switchgrass, and various wildflowers.

Landscape Use
Plant on the moist outlying areas of streams and vegetated swales where there may be periodic soil saturation or inundation. Useful on steep eroding lands. Can be planted in open woodlands. Commonly seeded in mixtures, not pure stands.

Management Concerns
Avoid using seed from areas different from the site. Planting in mature stands not recommended. Litter needs to be removed periodically by controlled burning or other methods. Seed in spring.

Zone
Plains

Wildlife Value
Cover for birds and small mammals.

WR BWR BMG

Mannagrass -
Glyceria striata

Plant Characteristics
Narrow leaf blades with spikelets of open panicles.

Mature Height
2' to 3'

Flowering Period
NA

Growth Rate
Rapid

Available Plant Forms
Bare root, containers.

Exposure
Sun to partial shade

Water Needs
Seasonally flooded to areas with shallow standing water.

Wetland Indicator
OBL

Soils
Mildly tolerant of saline soils.

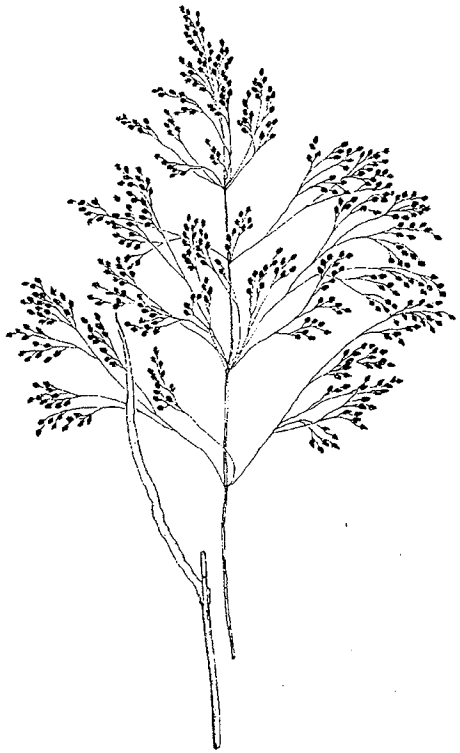
Habitat Characteristics
Shallow standing water or along slow moving streams.

Landscape Use
Rapid growth makes it useful for bank stabilization along streams and the edge of ponds. Use for wildlife habitat.

Management Concerns
N/A

Zone
Plains, foothills

Wildlife Value
Food for deer and waterfowl.



WR WHW WSW

Needle-and-Thread -
Stipa (Hesperostipa) comata

Plant Characteristics
Bunchgrass; thin, medium length leaves. A very long awn is attached to the spikelet which has a sharp, pointed tip. This resembles a needle with thread attached, hence the common name.

Mature Height
Mid grass, 1' to 3'

Flowering Period
Cool season

Growth Rate
Moderately easy to establish. Short-lived.

Available Plant Forms
Seeds

Exposure
Sun to partial shade.

Water Needs
Dry. Very drought tolerant. Prefers well-drained soils

Wetland Indicator
Upland

Soils
Sandy to loams

Habitat
Abundant taller grass in the plains and montane grasslands.

Landscape Use
Use to revegetate severely disturbed sites and blow-out areas. The beautiful drooping awns provide an attractive accent in open grasslands.

Management Concerns
May require supplemental watering for rapid establishment. The long sharp awns may be of concern in areas where domestic animals roam freely. Seed in fall or spring.

Zone
Prairie, foothills

Wildlife Value
Poor forage after maturity because long, sharp awns may irritate animals.

Needlegrass, green -
Stipa (Nassella) viridula

Plant Characteristics
This tall, bunchgrass has a deep, extended, fibrous root systems. Many, glossy, bright green leaves grow in a dense basal tuft. The long, narrow spike has many one-seeded spikelets with long, bent awns.

Mature Height
Mid to tall grass. 1.5' to 3.5'

Flowering Period
Cool season.

Growth Rate
Good growth rate with excellent seedling vigor. Average rate of establishment. Long-lived.

Available Plant Forms
Seeds

Exposure
Sun to tolerant of partial shade.

Water Needs
Adaptable. Tolerates occasional flooding. Good drought tolerance Prefers water table a few feet below the surface.

Wetland Indicator
Upland

Soils
Adaptable, thrives on clayey soils. Good in soils with poor fertility. Thrives on moderately alkaline soils. Fairly salt tolerant.

Habitat Characteristics
Occurs in moist intermittent drainages and in shallow depressions along the plains and foothills. Green needlegrass grows with western wheatgrass in the slightly moister areas of the plains. It is less commonly associated with silver sagebrush, blue, grama, and needle-and-thread.

Landscape Use
Use in seed mixtures for erosion control in grassy drainages and stream banks.

Management Concerns
Should not be planted as pure stands as it tends to thin out over time. Weeds need to be controlled, especially in the first month or two after germination. Seed in fall or spring.

Zone
Plains, foothills

Wildlife Value
Valuable to songbirds and small rodents.

BWR BMG BDG

Ricegrass, Indian -
Oryzopsis (Acnatherum) hymenoides

Plant Characteristics
A bunchgrass that forms a rounded shape. Wiry, light green leaves are as long as the flowering stalk. The small spikelets form a graceful open panicle that appears in the summer and persist through the winter. The seeds were extensively used by Native Americans.

Mature Height
3" to 9"

Flowering Period
Cool season

Growth Rate
Difficult to establish, but good growth rate after establishment. Short-lived but will reseed.

Available Plant Forms
Seed

Exposure
Full sun

Water Needs
Dry. Very drought tolerant.

Wetland Indicator
Upland

Soils
Occurs on sandy to silty soils, infertile soils. Adaptable to others as long as well-drained. Fairly tolerant of salt.

Habitat Characteristics
Occurs on the dryer plains and desert steeps on shaley or clayey soils. Indian ricegrass grows with prairie sandreed, sand bluestem, sand, sagebrush, sideoats grama, and sand dropseed.

Landscape Use
This graceful grass is useful in dry sandy areas where it may be difficult to grow other plants. Use in more formal landscapes as an attractive border or in rocky areas.

Management Concerns
Seeds are difficult to start and may need scarification treatment. Does not like competition. Seeds should be bought from local source as that increases the chance of germination. Seed in fall or early spring.

Zone
Plains

Wildlife Value
Seeds are highly nutritious to birds and small mammals

Rush, Baltic or Arctic -
Juncus balticus (arcticus)

Plant Characteristics
Sod-forming, wiry round stems grow from rhizomes. The flowers form loose to spreading clusters that appear to emerge from the side of the stem.

Mature Height
6" 30"

Flowering Period
Early summer

Growth Rate
Medium

Available Plant Forms
Containers, seeds

Exposure
Sun

Water Needs
Moist to saturated

Wetland Indicator
OBL

Soils
Moderately tolerant of alkaline and acidic conditions

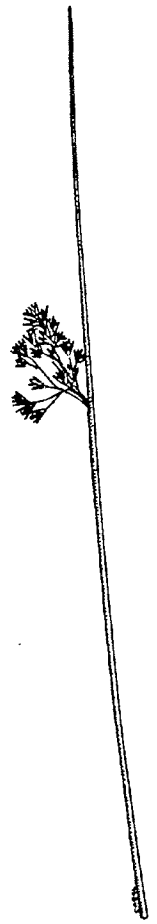
Habitat Characteristics
Occurs in a wide range of areas from alkaline wet meadows and marshes to drier intermittent swales and moist edges of ponds. Forms a dark band around the edge of streams and ponds. Similar to the conditions for threesquare but usually occurs in drier areas.

Landscape Use
Use in areas of widely fluctuating water tables near the edge of marshes, wet meadows, and ponds.

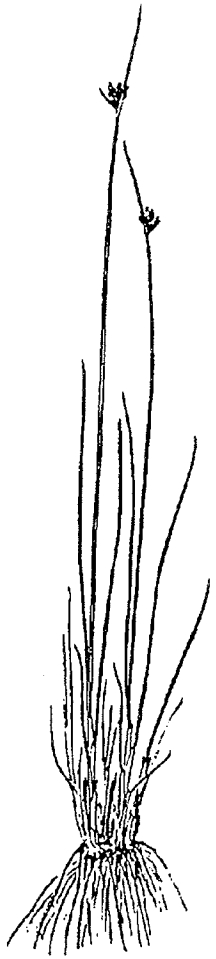
Management Concerns
May not grow well from seeds.

Zone
Plains, foothills

Wildlife Value
Cover for small mammals



Rush, Colorado -
Juncus confusus



Plant Characteristics
Densely tufted plant with numerous round stems. The long, narrow leaves are clustered at the base. Fan like clusters of flowers appear near the top of the stem.

Mature Height
6" to 12"

Flowering Period
Summer

Growth Rate
Medium

Available Plant Forms
Containers, seeds

Exposure
Sun to partial shade

Water Needs
Moist to saturated

Wetland Indicator
FAC+

Soils
Slightly tolerant of alkaline conditions.

Habitat Characteristics
Grows in moist to wet areas of meadows, streambanks and woods.

Landscape Use
Use in moist areas under trees and along the edge of streambanks and ponds. Useful for wildlife habitat.

Management Concerns
May not grow well from seeds.

Zone
Plains, foothills

Wildlife Value
Food and cover for waterfowl

WR WHW BWR

Saltgrass, Inland -
Distichlis spicata (stricta)

Plant Characteristics
Strongly rhizomatous plants with prostrate stems that turn up at the ends. Leaves grow at a sharp angle from the stem. The large spikelets occur in a loose cluster at the end of the stem. Male and female flowers grow on separate plants.

Mature Height
4" to 18"

Flowering Period
Warm season

Growth Rate
NA

Available Plant Forms
Seeds

Exposure
Sun

Water Needs
Dry to moist

Wetland Indicator
NI

Soils
Highly tolerant of saline and alkaline sites.

Habitat Characteristics
Grows on moist alkaline flats and along ditches.

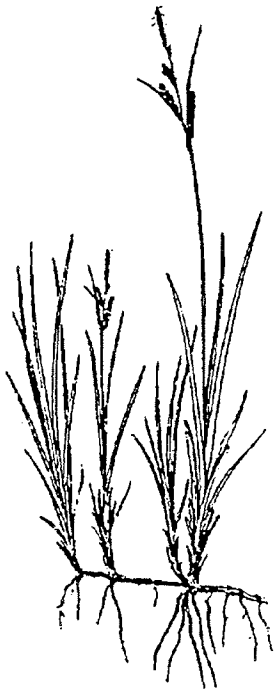
Landscape Use
Plant on moist medium to very salty or alkaline sites. Useful in areas that are too salty or saline for other species.

Management Concerns
Seed in spring.

Zone
Plains

Wildlife Value
NA

Sedge, Nebraska -
Carex nebrascensis



Plant Characteristics
Course stout plant with large blue green leaves that grow from long stout rhizomes. Sharply triangular stems with several long spikelets scattered at the end.

Mature Height
10" to 24"

Flowering Period
Midsummer

Growth Rate
Medium.

Available Plant Forms
Containers, seeds

Exposure
Sun

Water Needs
Seasonally high water table

Wetland Indicator
OBL

Soils
Moderately tolerant of saline and alkaline soils.

Habitat Characteristics
Can be found on the edge of alkaline flats and exposed lakeshores. Occurs in wet meadows and next to streams. Occurs in hotter, drier places than other sedges as long as roots are in saturated soils.

Landscape Use
Use in harsh areas with high water tables. Useful for erosion control. Plant in a hot, exposed marshy area where other wetland plants may not grow well.

Management Concerns
May not grow well from seeds.

Zone
Foothills, plains

Wildlife Value
Food and cover for waterfowl. Cover for small animals. Highly palatable to wildlife.

WHW WSW

Sedge, Woolly -
Carex lanuginosa

Plant Characteristics
Rhizomatous plants with sharply triangular stems. Dark green, flat leaf blades. Woolly flowering spikes.

Mature Height
1' to 3'

Flowering Period
NA

Growth Rate
Medium

Available Plant Forms
Bare root, containers, seeds

Exposure
Sun

Water Needs
Seasonally flooded to shallow standing water. Tolerates dry periods.

Wetland Indicator
OBL

Soils
Only mildly tolerant of saline or acidic soils.

Habitat Characteristics
Occurs in wet meadows and along ponds and streams from the plains to the subalpine.

Landscape Use
Use along the edge of streams and ponds especially in areas where fluctuating water levels are expected. Useful as a bank stabilizer. Also plant in wet meadows.

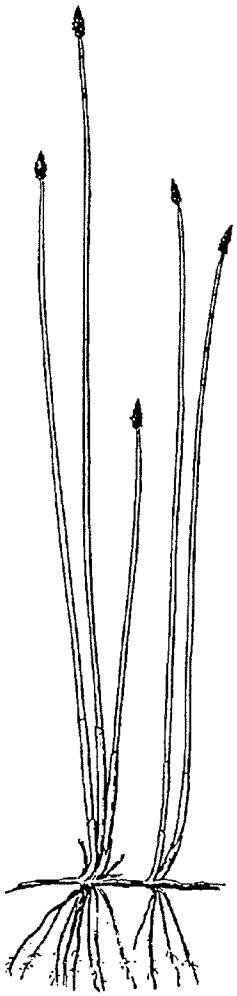
Management Concerns
May be difficult to grow from seeds.

Zone
Plains, foothills

Wildlife Value
Cover for waterfowl

WHW WSW

Spikerush, Creeping -
Eleocharis palustris



WHW WSW

Plant Characteristics
Rhizomatous with small clusters of thin to stout stems. Oval-shaped flower spikelet grows on top of the stem.

Mature Height
6" to 30"

Flowering Period
Late spring through summer

Growth Rate
Rapid

Available Plant Forms
Plants, seed

Exposure
Sun

Water Needs
Saturated to 6" of standing water.

Wetland Indicator
OBL

Soils
Tolerates alkaline conditions.

Habitat Characteristics
Widespread species on the plains and mountains of Colorado. Forms dense patches along the edge of ponds and streams and at the bottom of seasonally inundated alkaline depressions.

Landscape Use
Use to stabilize the soil at the edge of permanent ponds. Can be planted across the bottom of temporarily inundated detention ponds and drainages, especially in alkaline soils.

Management Concerns
Best to use plants.

Zone
Plains, foothills

Wildlife Value
Food for waterfowl

Spikerush, Needle -
Eleocharis acicularis

Plant Characteristics
Rhizomatous with slender, dark green stems forming dense clumps. On the top of the stems grow a tight cluster of flowers that give the appearance of a spear tip.

Mature Height
6" to 18"

Flowering Period
Summer

Growth Rate
Rapid

Available Plant Forms
Plants

Exposure
Sun

Water Needs
Saturated to up to 3" of inundation.

Wetland Indicator
OBL

Soils
Slight tolerance of alkaline soils

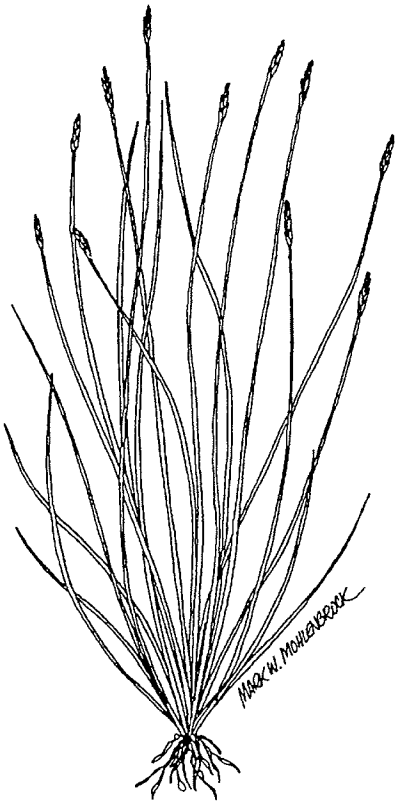
Habitat Characteristics
Occurs on marshy shores, margins of ponds, and other places with saturated soils.

Landscape Use
Use for bank and pond margin stabilization.

Management Concerns
May be difficult to grow from seeds.

Zone
Foothills, plains

Wildlife Value
Food for waterfowl



WHW WSW

Switchgrass -
Panicum virgatum

Plant Characteristics
This strongly rhizomatous species forms patchy sod. Tall stems have many, arching leaves. The leaves are often blue-green in the summer and turn an attractive muted red in the fall. The spikelets form a loose, delicate panicle.

Mature Height
2' to 5'

Flowering Period
Warm season

Growth Rate
Medium rate of establishment. Good seeding vigor. Long-lived.

Available Plant Forms
Seed.

Exposure
Sun to moderately shade tolerant

Water Needs
Moist. Tolerates some spring saturation but not tolerant of permanent high water table. Weakly drought tolerant. Moderately tolerant of saline soils.

Wetland Indicator
FAC

Available Plant Forms
Seed.

Habitat Characteristics
Switchgrass is an important component of the tall grass prairie along with big and little bluestem and yellow Indiangrass. In Colorado, this tall grass prairie is confined to streamsides and wet to moist meadows. Small amounts of switchgrass may occur in upland sandy soils, but not as a dominant species.

Landscape Use
Use in seed mixes or in pure stands along streambanks, especially for erosion control. Grow in open riparian forests that are not too deeply shaded (south facing slopes). Use as a small portion of seed mixes on sandy soils for erosion control. Can be used in wetland areas along streambanks in higher, more open areas.

Management Concerns
Use seed from local sources. Prefers good topsoil for planting. Under good conditions (moist, deep soils), this grass may aggressively take over a site, thereby crowding out other seeded grasses. Plant in spring.

Zone
Plains, foothills

Wildlife Value
Seeds provide food for birds and small mammals.

WR WHW BWR BMG

Wheatgrass, Slender -
Agropyron trachycaulum (Elymus trachycaulus)

Plant Characteristics
This short-lived, perennial grass usually grows in bunches with very short rhizomes. The spikelets alternative on either side of the flowering stem.

Mature Height
Mid grass

Flowering Period
Cool

Growth Rate
Establishes easily and quickly. Short-lived.

Available Plant Forms
Seeds

Exposure
Sun to partial shade

Water Needs
Moist to adaptable. Does not tolerate flooding well. Drought tolerant.

Wetland Indicator
FACU

Soils
Adaptable, best on loams to clay. Saline tolerant.

Habitat Characteristics
Grows in shallow depressions and other moist areas of the plains.

Landscape Use
Use in the early stage of restoration projects as it establishes easily and quickly. Can be planted in intermittent drainages as long as the soils aren't saturated for long periods.

Management Concerns
Short-lived; may disappear from a site. Plant in fall or spring.

Zone
Plains

Wildlife Value
Palatable to livestock

WR BWR BMG

Wheatgrass, Western -
Agropyron (Pascopyron) smithii

Plant Characteristics
This rhizomatous grass is sod-forming and has bluish-green leaves with a slightly waxy covering. The stiff leaves form a characteristic "V" where they join with the stem. The flower is a tightly over-lapping spikelet that alternatives on each side of the stem.

Mature Height
Mid-grass, flowering stem is 1' to 3'

Flowering Period
Cool season, flowers in June and goes dormant in mid-summer

Growth Rate
Slow germination and development, but spreads rapidly after establishment. Long-lived.

Available Plant Forms
Seed

Exposure
Sun to partial shade

Water Needs
Adaptable to flooding and moderate droughts.

Wetland Indicator
FACU

Soils
Loam to clay soils. Tolerates alkaline and saline soils.

Habitat Characteristics
Western wheatgrass is a very common species on the eastern plains and foothills. It can commonly be found in shallow depressions, subirrigated lowlands, and along intermittent drainages that get slightly more moisture than the surrounding areas. Occurs with alkali sacaton, buffalograss, and blue grama.

Landscape Use
Use for erosion control in grassy drainages and stream banks. Plant seed mixtures for natural sites, especially to stabilize erosive sandy to clayey soils. Can be planted on slopes above drainages that receive slightly more moisture and are closer to the water table than the dry upper prairie slopes.

Management Concerns
Weed control methods such as mowing and grazing are recommended in the early part of the first growing season. Plant in fall or spring. May be invasive, especially in areas of adequate moisture.

Zone
Plains, foothills

Wildlife Value
Moderately palatable especially in winter.

WR BWR BMG BDG

Wildrye, Canada or Nodding -
Elymus canadensis

Plant Characteristics
Coarse bunchgrass with fibrous roots. Can spread by tillers. Long, flat leaf blades. The large, nodding spikelets have long distinctive awns.

Mature Height
2' to 4'

Flowering Period
Cool season.

Growth Rate
Fairly easy establishment with vigorous seedlings. Rapidly spreads; short-lived.

Available Plant Forms
Seeds

Exposure
Shade to sun

Water Needs
Moist to wet. Tolerates short term flooding and saturation. Relatively tolerant of summer drought.

Wetland Indicator
FACU

Soils
Adaptable. Salt tolerant.

Habitat Characteristics
This grass occurs in shady riparian areas and lake shores. Also is commonly found along fence rows.

Landscape Use
Use in shady areas under trees and shrubs in drainages. Useful for bank stabilization. Can be used as a rapid developer and site stabilizer in seeding mixes.

Management Concerns
Not very competitive in mixtures over long periods of time. Plant in fall or spring.

Zone
Foothills, plains

Wildlife Value
Good palatability

WR BWR BMG

Forbs

Arrowhead -
Sagittaria latifolia

Plant Characteristics
Tuberous root eaten by Native Americans and wildlife. The flowering stalk with a cluster of showy white flowers rising from the loose tuft of arrow shaped leaves.

Mature Height
6" to 18"

Flowering Period
July-August

Growth Rate
Rapid

Available Plant Forms
Containers

Exposure
Sun

Water Needs
6" to 12" of standing water.

Wetland Indicator
OBL

Soils
Moderately salt tolerant and mildly acid tolerant

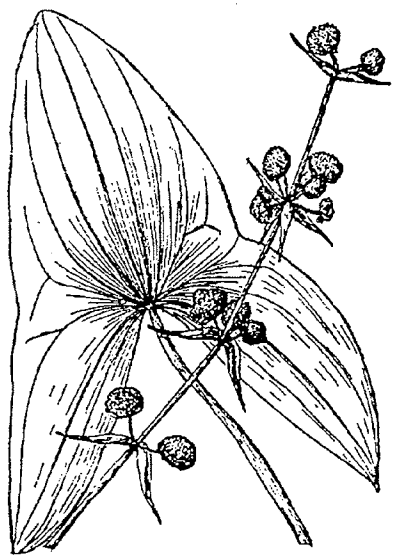
Habitat Characteristics
Found in muddy ditches and along pond shores on the plains and lower foothills.

Landscape Use
Plant clumps in shallow water intermixed with taller clumps of bur-reed and bulrushes. Makes a very attractive addition to the edge of ponds.

Management Concerns
Need to protect establishing plants from waterfowl.

Zone
Plains, foothills

Wildlife Value
The tuberous roots make this a desirable plant for waterfowl. Also, food for small mammals.



Blanketflower, Native -
Gaillardia aristata

Plant Characteristics
Grayish-green leaves form a dense clump at the base of the plant. Erect to spreading flower stems rise from the clump. Daisy-like flowers consisting of reddish-brown centers circled by red ray flowers with yellow tips.

Mature Height
2', Spreading 1.5' to 2'

Flowering Period
June till frost

Growth Rate
Flowers first year from seed. Self seeds.

Available Plant Forms
Seeds, plants.

Exposure
Sun

Water Needs
Drought tolerant. Not tolerant of heavy, wet winter soil.

Wetland Indicator
Upland

Soils
Adaptable

Habitat Characteristics
Grows in sagebrush areas and dry meadows of foothills and plains. Occurs with rubber rabbitbrush, blue grama, buffalograss, sideoats grama, prairie coneflower, penstemon, and dotted gayfeather.

Landscape Use
Use in a seed mix for dry grassy areas to provide scattered areas of attractive red flowers from midsummer to the fall. Useful for erosion control. Plant along the edge of roads and pathways. Especially effective when planted in groups of 3 or more.

Management Concerns
Need to make sure seed is from native plant and not a hybrid. Otherwise, the next generation of seed won't be true to type.

Zone
Plains, foothills

Wildlife Value
Nectar source for butterflies, bees, and moths

Coneflower, Prairie or Mexican Hat -
Ratibida columnifera

Plant Characteristics
Upright stems grow from relatively shallow taproots forming an airy clump. Bright green, finely divided leaves grow from the middle of the stem up. Showy flowers with droopy, yellow to purple outer rays growing around the brown column.

Mature Height
1' to 2'; spreads 1' to 1.5'

Flowering Period
Plant starts turning green in spring and flowers in the summer.

Growth Rate
Germinates in about a month. Fair seedling vigor. Slow growth. Short-lived, 2 to 3 years.

Available Plant Forms
Seeds and plants

Exposure
Sun

Water Needs
Relatively dry, but not in the driest areas. Tolerates moist soils.

Wetland Indicator
Upland

Soils
Clays to rocky, gravely, and sandy soils. Best on well-drained loams. Tolerates poor soil.

Habitat Characteristics
Commonly found on open sites on the outwash mesa and plains. Usually grows with little bluestem, sideoats grama, western wheatgrass, and blue grama, buffalograss, penstemons, and dotted gayflower.

Landscape Use
This easy to establish flower can be used in a seed mixture of short and mid grass prairie species to add scattered color to the restored prairie. Flowers for most of the summer. Also can be planted in clusters as an accent in specific areas.

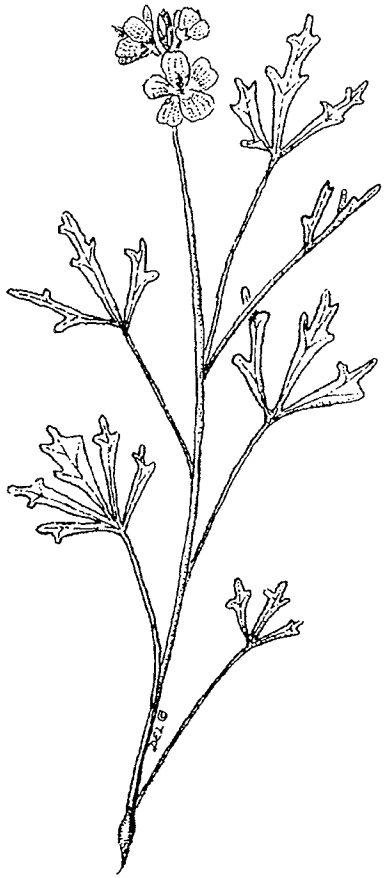
Management Concerns
Only fair seedling vigor. Short-lived, but reseeds.

Zone
Plains, foothills.

Wildlife Value
Songbirds and small mammals eat the seeds. Butterflies, hummingbirds, bees, and moths use the nectar.

BMG BDG

Cowboy's delight or Scarlet Globemallow - *Sphaeralcea coccinea*



Plant Characteristics
Spreading rhizomes. Grayish green, finely divided leaves. Bright red-orange flowers are clustered at the top of the stem.

Mature Height
4' to 6'

Flowering Period
May to July

Growth Rate
NA

Available Plant Forms
Seeds

Exposure
Full sun.

Water Needs
Dry, very drought tolerant.

Wetland Indicator
Upland

Soils
Clayey to sandy soils

Habitat Characteristics
Disturbed sites.

Landscape Use
Use for erosion control on upper gullies and along roads in dry prairie areas. Attractive plant for rock gardens.

Management Concerns
Needs open areas as it is a poor competitor. May be difficult to grow in a seeding mix with other species.

Zone
Plains, foothills

Wildlife Value
Plants eaten by small mammals

Easter Daisy -
Townsendia exscapa

Plant Characteristics
Large white flowers are nestled in a cluster of linear leaves. Grows close to the ground.

Mature Height
2" to 6"

Flowering Period
Early spring

Growth Rate
NA

Available Plant Forms
Containers

Exposure
Sun

Water Needs
Adaptable to dry

Wetland Indicator
Upland

Soils
Coarse

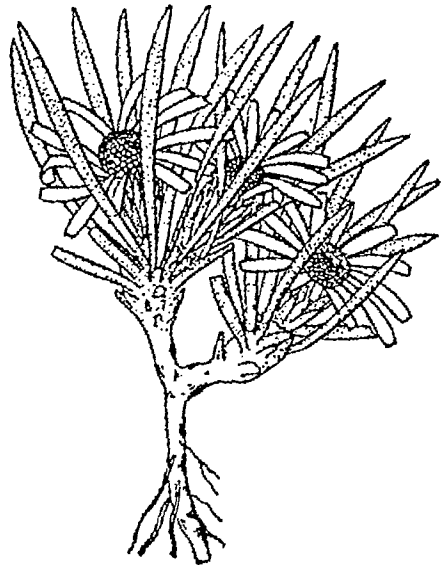
Habitat Characteristics
Grows in open, rocky areas along the outwash mesas and plains of Colorado. One of the first plants to flower in the spring.

Landscape Use
Use for early spring color in a short grass prairie setting with blue grama or buffalograss; also plant in rocky areas.

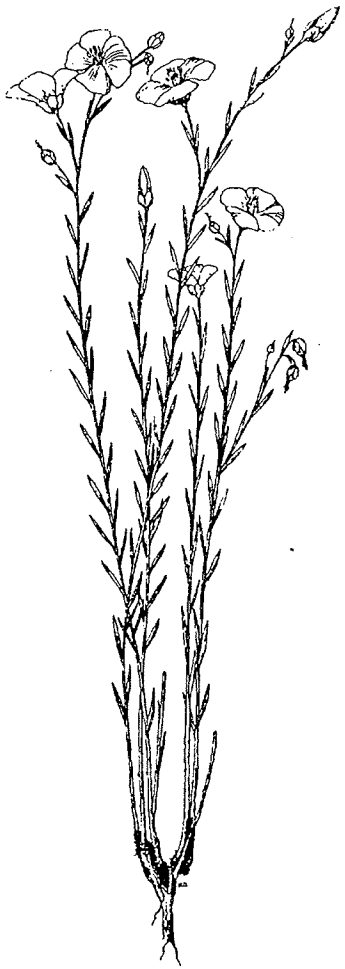
Management Concerns
Easily shaded out in taller grasslands and shrubby areas.

Zone
Plains

Wildlife Value
NA



Flax, Wild Blue -
Linum (Adenolinum) lewisii



Plant Characteristics
Slender, herbaceous stems spread out from a woody perennial taproot. Small, dark-green leaves. The bright blue flowers bloom in a cluster at the top of each stem. Flowers open at dawn on warm days with the petals falling by noon.

Mature Height
12"

Flowering Period
Blooms May to July

Growth Rate
Germinates and establishes relatively quickly for a native herb. Short-lived

Available Plant Forms
Seed, containers

Exposure
Full sun

Water Needs
Drought tolerant. Does not tolerate high water tables.

Wetland Indicator
Upland

Soils
Well-drained porous soils, especially on slopes and ridges. Tolerates salty soils.

Habitat Characteristics
Occurs on open rocky soils on the western prairie and foothills. In early summer, blue flax dots the prairies near the foothills.

Landscape Use
This short-lived species is good to plant in the beginning of a restoration project as it prefers open ground. Provides a beautiful cover while the other longer-lived species slowly establish themselves.

Zone
Plains, foothills

Wildlife Value
The vegetation provides food for deer, and birds eat the seeds.

Management Concerns
Easily shaded out by other plants.

Gayfeather, Dotted -
Liatris punctata

Plant Characteristics
Narrow flowering stems rise from a tuft of grass-like leaves. The gray-green, dotted leaves are taller at the bottom and shrink as they extend up the stem. Bright pinkish lavender flowers grow in a narrow spike at the top of the stem. Deep tuberous tap root

Mature Height
2', spreading 12" to 18"

Flowering Period
Mid-summer to frost

Growth Rate
Slow to establish but then moderate growth rate, long-lived.

Available Plant Forms
Seed, plants

Exposure
Full sun

Water Needs
Low

Wetland Indicator
Upland

Soils
prefers gravely, poor, shallow soils. Grows more weedy with richer, moist soils.

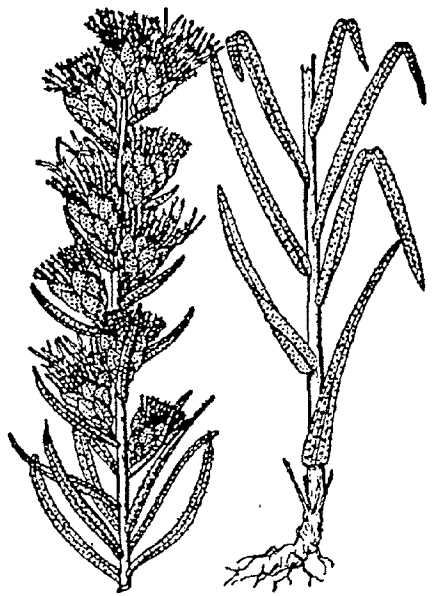
Habitat Characteristics
Found in the grasslands of the foothills, outwash mesas, and plains. Occurs with blue grama, and Indian ricegrass.

Landscape Use
Use with warm season grasses as erosion control on slopes and upper stream banks. Useful as an accent plant for fall color.

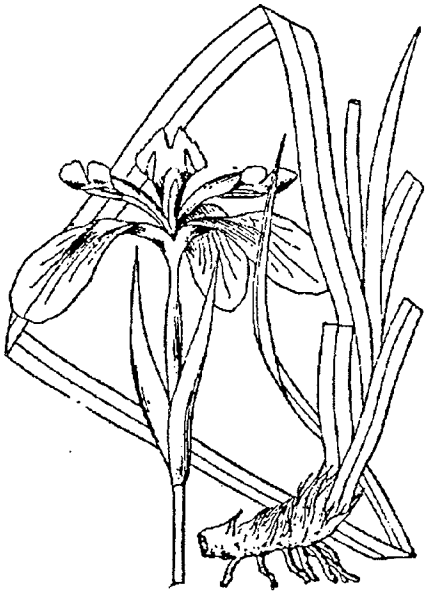
Management Concerns
Slow to establish

Zone
Plains, foothills.

Wildlife Value
Nectar source for butterflies and bees. Not usually browsed by deer.



Iris, Wild or Western -
Iris missouriensis



Plant Characteristics
Spreads by thick rhizomes. Stiff thin leaves are clustered at the base. The flowering stems barely grow over the top of the stem and produce a few large, showy pale to dark blue flowers.

Mature Height
18" to 24"

Flowering Period
May to June

Growth Rate
Slow

Available Plant Forms
Plants, seeds

Exposure
Full sun

Water Needs
Temporarily flooded with a summer dry period.

Wetland Indicator
OBL

Soils
Moderately alkaline tolerant

Habitat Characteristics
Commonly found in wet meadows and along broad streams from the plains to the mountains especially where soils are dry in late summer.

Landscape Use
Use in wet meadows or along streams with high a water table in spring that dries out later in the summer. Plant in scattered clumps to provide an attractive wash of blue color in early summer.

Management Concerns
Poisonous to livestock

Zone
Foothills, plains

Wildlife Value
NA

Milkweed, showy -
Asclepias speciosa

Plant Characteristics
Large, spear-shaped leaves occur in pairs on the tall stems with milky sap. Clusters of showy rose pink flowers grow at the end of the stems. In late summer, large pods form that contain numerous silky white seeds.

Mature Height
3'

Flowering Period
Summer

Growth Rate
NA

Available Plant Forms
Seeds

Exposure
Sun

Water Needs
Adaptable to moist

Wetland Indicator
FAC

Soils
NA

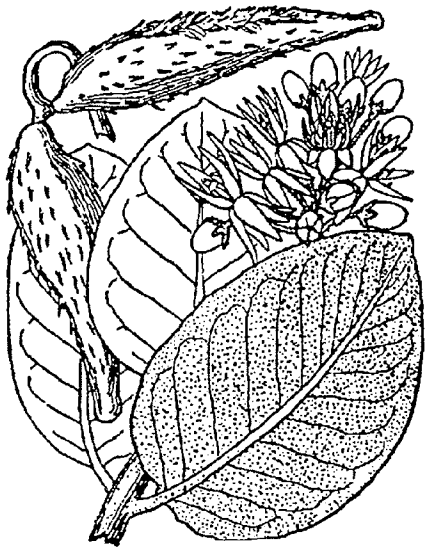
Habitat Characteristics
Occurs in open areas along fences, on the upper banks of streams and lakes, and other open areas of the prairie.

Landscape Use
A beautiful flower to plant in visible areas on banks and along fences.

Management Concerns
NA

Zone
Plains, foothills

Wildlife Value
Attracts butterflies



Milkweed, Swamp -
Asclepias incarnata

Plant Characteristics
Rhizomatous. Tall, green stems with pairs of narrow to oval shaped, thick leaves. A showy, spherical cluster of pink flowers grows at the end of the stem.

Mature Height
Up to 4'

Flowering Period
June to August

Growth Rate
Slow

Available Plant Forms
Plants, seeds

Exposure
Sun, partial shade

Water Needs
Seasonally saturated. Drought tolerant

Wetland Indicator
OBL

Soils
Moderately tolerant of alkaline soils

Habitat Characteristics
Grows with sedges and grasses in wet meadows.

Landscape Use
Use this attractive, long-flowering plant scattered through meadows with a high water table.

Management Concerns
Slow growth rate

Zone
Foothills, plains

Wildlife Value
Food for songbirds and small mammals.

WR WHW

Onion, Nodding -
Allium cernuum

Plant Characteristics
Flowering stalk grows from a cluster of linear leaves. White flowers form a cluster at the end of the nodding stem.

Mature Height
1'-2.5'

Flowering Period
July-August

Growth Rate
NA

Available Plant Forms
Seed

Exposure
Sun

Water Needs
Dry

Wetland Indicator
Upland

Soils
Variable, rocky.

Habitat Characteristics
Usually found on grassy slopes and dry meadows of the foothills and mountains.

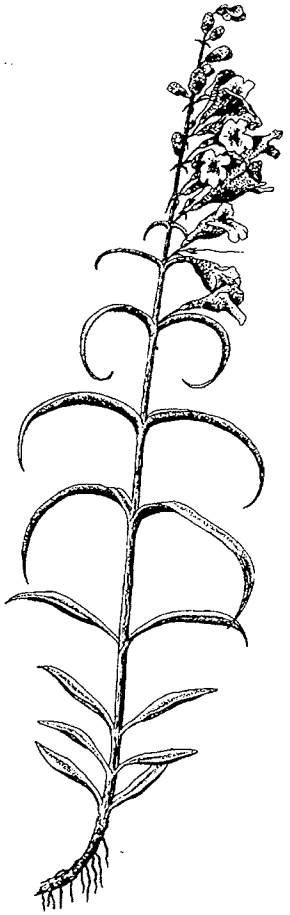
Landscape Use
Use in a grass mix on dry grassy slopes.

Management Concerns
NA

Zone
Foothills

Wildlife Value
Nectar source for butterflies and bees. Small mammals dig up and eat the underground onion.

Penstemon, Rocky Mountain -
Penstemon strictus



Plant Characteristics
Large, midnight flowers form an open spike at the end of the stout flowering stalk. The cluster of narrow, glossy green leaves turn purplish in the fall. Fibrous, somewhat shallow roots.

Mature Height
20" to 30", spreads 12' to 18'

Flowering Period
May to June

Growth Rate
Seedling vigor good for native forbs. Hardy. Long-lived.

Available Plant Forms
Seeds, plants

Exposure
Although found in semi-shaded spots, grows best in open, exposed areas.

Water Needs
Moderate to dry. Weakly moderate drought tolerance.

Wetland Indicator
Upland

Soils
Rocky to sandy to loamy soils. Thin-soil.

Habitat Characteristics
Usually found in open shrublands and woodlands of the foothills and mountains. Grows with big sagebrush, juniper, mountain mahogany and snowberry along with numerous grasses and forbs.

Landscape Use
Use this attractive plant on roadsides and other slopes for soil stabilization. Useful in rock gardens.

Management Concerns
Germination best when using seeds from local sources. Seed as early as possible in the spring. Does not do well when crowded and shaded by other species.

Zone
Foothills

Wildlife Value
Songbirds and small mammals eat the seeds. Nectar source for butterflies, hummingbirds, bees, and moths.

Prairieclover, purple -
Petalostemon purpureum (Dalea purpurea)

Plant Characteristics
Several branching stems grow from a woody taproot. The leaves consist of 3-7 linear leaflets. Small rose-purple flowers are clustered on a thick spike. Small one or two-seeded pods.

Mature Height
1' to 3'

Flowering Period
Starts greening in mid to late spring and produces flowers from late May to July.

Growth Rate
NA

Available Plant Forms
Seeds or plants

Exposure
Sun to partial shade

Water Needs
Low to moderate. Moderately drought tolerant. Prefers well-drained soils

Wetland Indicator
Upland

Soils
Clay loams to loamy sands. Can grow on moderately alkaline soils

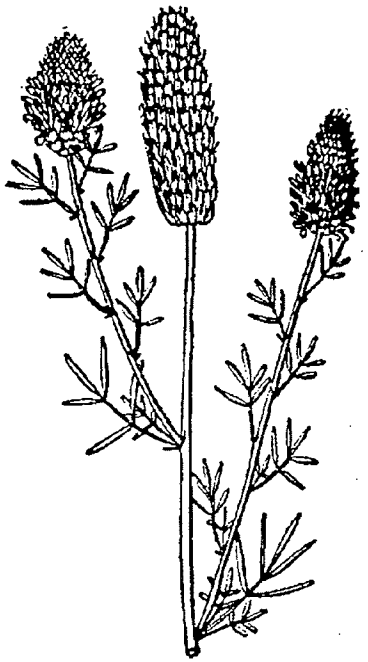
Habitat Characteristics
Commonly found on the plains from the base of the foothills eastward. Can be found in open woodlands. Associated with mixed and tallgrass prairie species such as big and little bluestem, and sideoats grama.

Landscape Use
Use with native grasses in revegetating slopes and dry prairie. Can be planted in open woodlands such as grassy areas under cottonwoods on the upper banks of streams. Small plants can be scattered through a grassland seeded area.

Management Concerns
Seeds should be inoculated when planting on sites lacking any prairie clover history. Drill scarified seed before the moistest growing season.

Zone
Plains

Wildlife Value
Some value to birds and small mammals. Seedlings eaten by small mammals.



BWR BMG BDG

Pussytoes, Rose -
Antennaria rosea

Plant Characteristics
Creeping ground cover forms a mat of small, woolly, gray-green leaves. Arising from this bed of leaves is a slender stalk with delicate pink flower heads that look like a cat's paws.

Mature Height
3", spreads 8" to 12"

Flowering Period
Spring/early summer

Growth Rate
Spreads rapidly.

Available Plant Forms
Plants, seeds, division.

Exposure
Sun

Water Needs
Dry, extremely drought tolerant

Wetland Indicator
Upland

Soils
Sandy to clay. Prefers sandy, well drained soils.

Habitat Characteristics
Grows on dry exposed slopes from the foothills to the alpine zones.

Landscape Use
Plant or use in a seed mix on open, dry slopes, especially in areas where other plants may not grow. Use in rocky areas.

Management Concerns
Plants may invade surrounding areas. During droughts, leaves may go dormant after flowering.

Zone
Foothills

Wildlife Value
Eaten by dear, and small mammals. Host for larval butterflies.

Sandverbena, snowball -
Abronia fragrans

Plant Characteristics
Long, dark red stems spread across the ground. The fleshy, forest-green leaves contrast with the small white flowers that are clustered in a large ball.

Mature Height
Up to 2', spreading.

Flowering Period
Blooms mid to late summer

Growth Rate
NA

Available Plant Forms
Seeds

Exposure
Sun

Water Needs
Adaptable

Wetland Indicator
Upland

Soils
Sandy

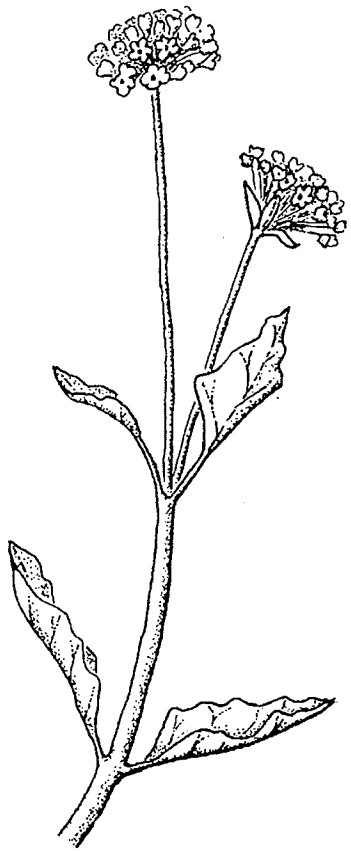
Habitat Characteristics
This lovely flower grows in sandy soils across the plains.

Landscape Use
Plant in sandy grasslands to provide color and attract butterflies.

Management Concerns
NA

Zone
Plains

Wildlife Value
Provides nectar for butterflies and bees



Smartweed -
Polygonum (persicaria) pensylvanicum

Plant Characteristics
Annual. Small, pale pink flowers on relatively long, narrow spikes.

Mature Height
to 4'

Flowering Period
Mid summer

Growth Rate
Rapid

Available Plant Forms
Bare root, container

Exposure
Full sun

Water Needs
Saturated soils to 6" of standing water.

Wetland Indicator
FACW/OBL

Soils
Tolerates poor soils. Moderately tolerant of alkaline soils.

Habitat Characteristics
Occurs in areas of standing water and wet meadows.

Landscape Use
The delicate pink flowers provide an attractive counterpoint to the grass-like cattails and bulrushes of marshes and ponds.

Management Concerns
Annual, may not reseed.

Zone
Plains, foothills

Wildlife Value
Food and cover for birds.

WHW WSW

Sunflower, Common -
Helianthus annuus

Plant Characteristics
Robust, very tall annual with large heart-shaped leaves growing on a thick stem. The yellow flowers have dark centers up to 4" wide. This is the wild ancestor of cultivated varieties.

Mature Height
10'

Flowering Period
May to August

Growth Rate
Establishes easily.

Available Plant Forms
Seeds

Exposure
Full sun

Water Needs
Dry to moderate. Drought tolerant

Wetland Indicator
FACU

Soils
Adaptable

Habitat Characteristics
Often found in large colonies in disturbed sites such as roadsides and abandoned farm fields.

Landscape Use
Attractive plant for areas where quick growth is needed. Plant in seed mix with slower growing grasses to provide early plant growth while the grasses get established.

Management Concerns
Tends to be weedy.

Zone
Foothills, plains

Wildlife Value
Seeds eaten by a wide variety of animals. Muskrats and deer eat the plants. Host for larval butterflies.

Vervain, Blue -
Verbena hastata

Plant Characteristics
Dense fibrous roots. Dark-green, lance-shaped leaves cover the branches. At the end of the stems are spikes of soft small dark blue flowers.

Mature Height
18" to 30"

Flowering Period
Mid-summer

Growth Rate
Slow

Available Plant Forms
Plants, seeds

Exposure
Sun

Water Needs
Moist to seasonally saturated.

Wetland Indicator
OBL

Soils
Slightly tolerant of alkaline soils

Habitat Characteristics
Grows around cattail/bulrush marshes and within wet meadows.

Landscape Use
Can plant for visual interest in wet meadows and around cattail/bulrush marshes.

Management Concerns
Slow growth rate

Zone
Foothills, plains

Wildlife Value
Food for upland birds and small mammals. Nectar source for butterflies.

Water Plantain -
Alisma plantago-aquatica (triviale)

Plant Characteristics
Oval, parallel leaves form a loose cluster. From the leaves arises an upright flower stalk scattered with small white or pink flowers.

Mature Height
12" to 18"

Flowering Period
Summer

Growth Rate
NA

Available Plant Forms
Plants

Exposure
Sun

Water Needs
Saturated soils to standing water

Wetland Indicator
OBL

Soils
NA

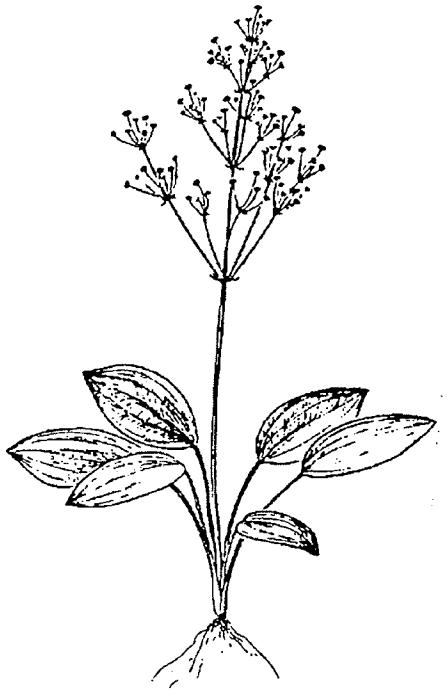
Habitat Characteristics
In standing water or mud flats from the plains to the mountains

Landscape Use
Grow in areas of shallow standing water or on muddy shores. Plant with arrowhead surrounding taller plants such as cattails and bulrushes.

Management Concerns
NA

Zone
Plains, foothills.

Wildlife Value
NA



WHW WSW

Appendices

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Glossary

Alkaline (sodic)
A soil with a high pH (low acid content), and high alkali content.

Bare Root
Plants without soil around their roots.

Best Management Practices (BMPs)
Economically feasible conservation practices and management measures (see City of Boulder Wetlands Protection Program Best Management Practices).

Bract
A small leaf-like structure, usually attached to a flower.

Buffer Zone
A moist area of vegetation used as a neutral zone between development or dry land and a wetland. In the City of Boulder, a buffer zone is a regulated area with boundaries determined according to criteria set forth in Ordinance 5521 § 9-12-4(f).

Containers
Various size pots or trays containing soil and plants suitable for transplanting.

Cuttings
Sections of plants that are cut and placed in water.

Forbs
Herbaceous vegetation other than grass and grass-like plants.

Foothills
Low hills at or near the foot of a mountain range.

Herbaceous
Non-woody vegetation: grasses, grass-like plants and forbs.

Hybrid
Offspring of two different species.

Hydric
Plants adapted to saturated soils.

Hydrology
The study of water.

Jurisdictional Wetland
A wetland that meets the U.S. Army Corps of Engineers criteria for wetlands set forth in the 1987 Corps of Engineers Wetland Delineation Manual.

Marshes
A wetland of inundated to saturated soils covered with herbaceous vegetation.

Mesic
Moist.

Plains
The rolling grasslands east of the foothills.

Plugs
Small plants that have been started in trays and are ready to transplant.

Poles
A tree branch that can be re rooted.

Rhizome
An underground stem that acts as a root. Rhizomatous (adj.).

Saline
High salt concentration.

Glossary

Saturated
A soil that has reached maximum water retention.

Scarification
The roughening of a seed, sometimes with acid, in order to help growth.

Sod
The top layer of soil that contains grass and its roots.

Spikelets
The smallest unbranched flower cluster of grasses and sedges.

Stock
The main stem or trunk of a plant or tree.

Sucker
A plant that grows from the root of the original plant.

Topsoil
The top layer of soil where most of the nutrients are found.

Tuber
A fleshy, underground stem or root.

Tufted
Clumped, with stems clustered together at the base.

Water Table
The level underground at which the earth is saturated due to underground water sources.

Wetland
Areas where soils are saturated long enough for hydric plants to grow.

Wetland Indicator
Rating that reflects the probability of a species to occur in a wetland.

OBL (Obligate Wetland) — Almost always occurs in a wetland (estimated probability of >99%).

FACW (Facultative Wetland) — Usually occurs in wetlands (estimated probability of 67% to 99%) but occasionally found in non-wetlands.

FAC (Facultative) — Equally likely to occur in wetlands or non-wetlands (estimated probability 34% to 66 %).

FACU (Facultative Upland) — Usually found in non-wetlands (estimated probability 67% to 99%) but occasionally found in wetlands.

NI (No Indicator) — Not rated because of insufficient information.

A "+" sign indicates the higher end of the category (more frequently found in wetlands); a "-" sign indicates the lower end of the category (more frequently found in non-wetlands).

Wet Meadows
Wetlands of grasses and other herbaceous species supported by high water tables.

Xeric
Dry.