Vascular Flora of a Gypsum Dominated Site in Major County, Oklahoma

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A total of 233 taxa of vascular plants in 173 genera and 61 families were collected at a site dominated by gypsum outcrops in Major County. The largest families were the Asteraceae (44 species), Poaceae (40 species), Fabaceae (14 species), and Euphorbiaceae (13 species). Seventy-seven species were annuals, 2 were biennials, and 152 were perennials. Twenty woody plant species were collected and 22 exotic species (10.6% of the total flora) were also present. Three species tracked by the Oklahoma Natural Heritage Inventory (*Chamaesyce carunculata*, *Echinocereus reichenbachii*, and *Escobaria vivipara)* were present. This study reports 83 species previously not documented in Major County.

INTRODUCTION

Review of data in the Oklahoma Vascular Plant database (OVPD; Hoagland et al 2005) indicates that the flora of Major County is under-documented. Prior to 2004, the year collecting began for this study, 417 species were reported from Major County. G. W. Stevens made the first plant collections in Major County from May and July of 1913. During that time, he collected 74 species. Additional peak years for plant collecting in Major County were 1947 (22 specimens) and 1985 (39 specimens; Hoagland et al 2005). The objective of this study was to document the flora of a specific site thereby adding to the comprehensive species list for Major County.

STUDY AREA

The site encompasses over 80 hectares in Major County (Fig. 1). Latitudinal extent ranges from 36.42°N to 36.41°N and longitudinal extent from 98.94°W to 96.95°W, and is located within the Subtropical Humid (Cf) climate zone (Trewartha 1968). Summers are warm (mean July temperature = 28.5°C) and humid, and winters are relatively short and mild (mean January temperature = 1.4°C). Mean annual precipitation is 70 cm, with periodic severe droughts (Oklahoma Climatological Survey 2005). The study area is located in the Osage Plains section of the Central Lowlands province (Hunt 1974) and within the Cimarron Gypsum Hills province of Oklahoma (Curtis and Ham 1979). Elevation ranges from 457 m to 508 m. The surface geology consists of Permian age gypsum outcrops and red sandstone and shale (Branson and Johnson 1979). Soils are of the Weymouth-Vernon-gypsum outcrop association, which are shallow, moderately sloping, loamy soils (Allgood et al 1968). Mixedgrass prairie is the predominant potential vegetation type (Duck and Fletcher 1943).

METHODS

Three collection sites were established for intensive floristic sampling. Sites were visited once a month from March through October 2004. Sites were selected following a review of US Geological Survey 1:24,000 topographic maps and field reconnaissance.

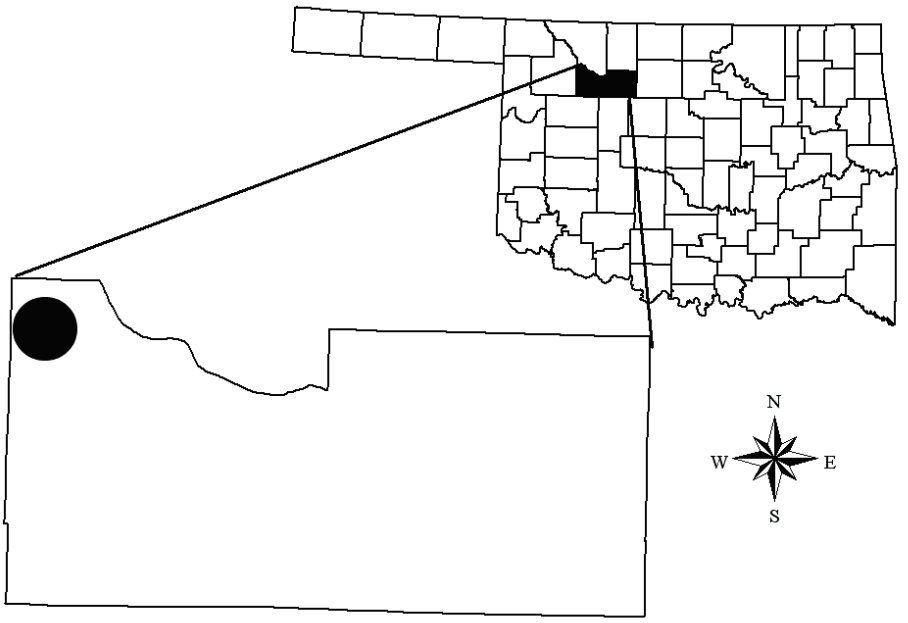

Figure 1: Location of Major County study area.

The predominant vegetation associations at these sites were classified according to Hoagland (2000). However, collecting was not restricted to these sites, and previously uncollected species were gathered wherever they were encountered. Vouchers for exotic species were made from naturalized populations only, thus excluding cultivated and ornamental plants. Specimens were processed at the Robert Bebb Herbarium of the University of Oklahoma (OKL) following standard procedures. Manuals we used for specimen identification included those by Waterfall (1973) and Barkley (1986). Origin, either native or introduced, was determined by using Taylor and Taylor (1991) and USDA-NRCS (2005). Nomenclature follows the US Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS 2005). Voucher specimens were deposited at OKL.

RESULTS AND DISCUSSION

A total of 233 taxa of vascular plants in 61 families and 173 genera were collected (Table 1). Among the angiosperms, 50 were monocots and 179 were dicots. In addition, there were three species of pteridophytes and one gymnosperm. The families with the greastest number of species were Asteraceae (44), Poaceae (40), Fabaceae (14), and Euphorbiaceae (13). The largest genera were *Chamaesyce* (6 species) and *Asclepias* (5 species). Seventy-seven species were annuals, two biennials, and 152 perennials. Twenty woody plant species were present. A complete listing of plants is found in the Appendix.

Twenty-two species (10.6%) from 11 families were exotic. The Poaceae had nine

Table 1: Summary of floristic collections made in Major County, Oklahoma.*

Taxonomic group	Species	Native spp.	Exotic spp.
Pteridophyta	3	3	0
Coniferophyta	1	1	0
Magnoliophyta			
Magnoliopsida	179	167	12
Liliopsida	50	41	9
Total	233	212	21

* Table format follows Palmer et al (1995).

exotic species and the genus *Bromus* had two. At the Selman Living Laboratory (SLL), in adjacent Woodward County, 21 introduced species were recorded constituting 9% of the flora (Buckallew and Caddell 2003). These values are consistent with other floristic studies from Oklahoma, in which exotic species constitute 9-15% of the flora (Hoagland and Johnson 2001, 2004a, 2004b; Hoagland and Buthod 2003, 2004; Hoagland and Wallick 2003, Hoagland, Buthod, and Elisens 2004, Hoagland, Crawford-Callahan et al 2004). However, at two sites in McCurtain County, only 6.6% of the flora were exotic species (Hoagland and Johnson 2004c).

No federally listed threatened or endangered species were encountered. However, three species tracked by the ONHI (2005) were present: *Chamaesyce carunculata* (G5S1), *Echinocereus reichenbachii* (G5S2), and *Escobaria vivipara* (G5S2S3). This represents only the third population of *C. carunculata* found in Oklahoma; the other two are located in Woods County (Hoagland et al 2005). Species conservation ranks, presented parenthetically, are assigned according to the level of imperilment at the state (S) and global (G) levels on a scale of 1 - 5, with 1 representing a species that is imperiled and 5 a species that it is secure (Groves et al 1995).

A study of the SLL, a 129.5 ha site in Woodward County, recorded 229 species in 61 families (Buckallew and Caddell 2003). A comparison of the two floras seems warranted because they share gypsum grasslands. There were 142 species found at both sites. Ninety-one species recorded at this site were not reported at SLL, and 91 species were reported from SLL that were not encountered in this study. The differences in species composition may be a result of differences in habitats. For example, sandsage grassland, floodplain, and cave entrance habitats were reported from SLL but not here.

Prior to this research, the OVPD listed 417 taxa of vascular plants from Major County. Of the 233 species reported in this study, 144 had been previously reported (Hoagland et al 2005), but 83 species reported in this study had not. As a result of this study, 500 species are now known to occur in Major County.

The three collection sites were located in three vegetation associations. A brief description of each follows:

1. *Schizachyrium scoparium-Castilleja purpurea* var. *citrina-Lesquerella gordonii* herbaceous association

This vegetation type, which is typical of grasslands growing on gypsum substrates in western Oklahoma, was predominant in upland areas. Common associated species included *Bouteloua curtipendula, Chaetopappa ericoides, Comandra umbellata, Erioneuron pilosum, Hedyotis nigricans, Liatris punctata, Lithospermum incisum, Machaeranthera pinnatifida, Opuntia phaeacantha, Paronychia jamesii, Phacelia integrifolia, Psilostrophe tagetina, Symphyotrichum fendleri,* and *Yucca glauca.* Most of the woody plant species were found at the bottom of steep-sided ravines in the gypsum. These sites were dominated by *Quercus macrocarpa* and *Q. muehlenbergii*, with *Ribes aureum, Sideroxylon lanuginosum,* and *Symphoricarpos orbiculatus*. *Echinocereus reichenbachii* and *Escobaria vivparia*, both tracked by ONHI, occurred in this habitat.

2. Wetland and riparian vegetation

This vegetation type was restricted to the margins of the creek and a large pond on the property. Common associates included *Amorpha fruticosa, Baccharis salicina, Eleocharis palustris, Juncus torreyi, Panicum virgatum, Phyla lanceolata, Pluchea odorata, Polypogon monspeliensis, Populus deltoides, Ranunculus sceleratus, Salix nigra, Samolus valerandi,* and *Schoenoplectus pungens*.

3. Disturbed areas and old-field vegetation

Disturbed areas were designated as sites exhibiting signs of physical disruption, such as oil well pads, roadsides, and heavily grazed pastures along the creek. Common plants in disturbed areas included *Bothrio-*

chloa laguroides, *Cynodon dactylon*, *Digitaria ciliaris*, and *Setaria parviflora*. Old-fields were characterized by *Ambrosia trifida*, *Amphiachyris dracunculoides*, *Amaranthus rudis*, *Arenaria serpyllifolia*, *Descurainia pinnata*, *Oenothera laciniata*, *Prunus angustifolia*, *Quincula lobata*, *Solanum elaeagnifolium*, and *Salsola tragus*. *Chamaesyce carunculata*, a species tracked by ONHI, was found in this habitat.

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APPENDIX

Annotated species list for a site predominated by gypsum outcrops in Major County. The first entry is the life history (A = annual, B = biennial, P = perennial), followed by the collection number, and habitat (MGP = *Schizachyrium scoparium-Castilleja purpurea* var. *citrina-Lesquerella gordonii* herbaceous association, WETL = wetland and aquatic vegetation, DAOF = disturbed areas and old-field vegetation). Exotic species are denoted with an asterisk. Voucher specimens were deposited at the Robert Bebb Herbarium at the University of Oklahoma (OKL).

PTERIDOPHYTA

Ophioglossaceae

Ophioglossum engelmannii Prantl - P; AB-4550; MGP

Pteridaceae

Cheilanthes feei T. Moore - P; AB-6118; MGP

Pellaea atropurpurea (L.) Link - P; AB-6136; MGP

CONIFEROPHYTA

Cupressaceae

Juniperus virginiana L. - P; AB-4752; MGP, DAOF

MAGNOLIOPHYTA

MAGNOLIOPSIDA

Anacardiaceae

Rhus aromatica Ait - P; AB-6457; MGP

Apocynaceae

Apocynum cannabinum L. - P; AB-4747; MGP

Asclepiadaceae

Asclepias arenaria Torr. - P; AB-5072; MGP

A. asperula (Dcne.) Woods. - P; AB-5073; MGP

A. engelmanniana Woods. - P; AB-5189; MGP

A. latifolia (Torr.) Raf. - P; AB-5190; MGP

A. pumila (Gray) Vail - P; AB-5181; MGP

Asteraceae

Ambrosia psilostachya DC. - P; AB-6008; DAOF

A. trifida L. - A; AB-6139; DAOF

Amphiachyris dracunculoides (DC.) Nutt. - A; AB-6127; DAOF

Aphanostephus skirrhobasis (DC.) Trel. - A; AB-4781; DAOF, MGP

Artemisia filifolia Torr. - P; AB-6439; MGP

A. ludoviciana Nutt. - P; AB-6129; MGP

Baccharis salicina Torr. & Gray - P; AB-5194; WETL

Chaetopappa ericoides (Torr.) Nesom - P; AB-5165; MGP

Cirsium undulatum (Nutt.) Spreng. - P; AB-5077; DAOF, MGP

Conyza canadensis (L.) Cronq. - A; AB-5179; OF

Coreopsis grandiflora Hogg ex Sweet - P; AB-4757; MGP

C. tinctoria Nutt. - A; AB-5098; DAOF

Echinacea angustifolia DC. - P; AB-4776; MGP

Engelmannia peristenia (Raf.) Goodman & Lawson - P; AB-4751; MGP

Erigeron strigosus Muhl. ex Willd. - A; AB-5099; MGP

Eupatorium serotinum Michx. - P; AB-6010; WETL

Evax verna Raf. - A; AB-4764; DAOF, MGP

Gaillardia pulchella Foug. - A; AB-4742; MGP

G. suavis (Gray & Engelm.) Britt. & Rusby - P; AB-4559; MGP

Grindelia nuda Wood - P; AB-6447; DAOF

G. papposa Nesom & Suh - A; AB-6114; DAOF

Gutierrezia sarothrae (Pursh) Britt. & Rusby - P; AB-6459; MGP

Haploesthes greggii Gray - P; AB-6016; MGP

Helianthus annuus L. - A; AB-5069; DAOF

Heterotheca stenophylla (Gray) Shinners - P; AB-5097; MGP

Hymenopappus scabiosaeus L'Her - P; AB-4816; MGP

Iva annua L. - A; AB-6123; WETL

Lactuca ludoviciana (Nutt.) Riddell - B; AB-6007; WETL

Liatris punctata Hook. - P; AB-6133; MGP

Machaeranthera pinnatifida (Hook.) Shinners - P; AB-5096; MGP

Pluchea odorata (L.) Cass. - P; AB-6117; WETL

Psilostrophe tagetina (Nutt.) Greene - P; AB-4750; MGP

Pyrrhopappus grandiflorus (Nutt.) Nutt. - P; AB-4578; MGP

Ratibida columnifera (Nutt.) Woot. & Standl. - P; AB-5116; MGP

Solidago petiolaris Ait. - P; AB-6460; MGP

Symphyotrichum ericoides (L.) Nesom - P; AB-6455; MGP

S. fendleri (Gray) Nesom - P; AB-6454; MGP

S. oblongifolium (Nutt.) Nesom - P: AB-6443; MGP

Thelesperma ambiguum Gray - P; AB-5187; MGP

T. filifolium (Hook.) Gray - P; AB-5188; MGP

T. megapotamicum (Spreng.) Kuntze - P; AB-4825; MGP

Verbesina encelioides (Cav.) Benth. & Hook. f. Gray - A; AB-6437; DAOF

Vernonia baldwinii Torr. - P; AB-5183; DAOF

Xanthium strumarium L. - A; AB-5113; WETL

Boraginaceae

Lithospermum incisum Lehm. - P; AB-4761; MGP

Brassicaceae

Capsella bursa-pastoris (L.) Medik.* - A; AB-4567; DAOF

Descurainia pinnata (Walt.) Britt. - A; AB-4569; DAOF, MGP
Draba brachycarpa Nutt. ex Torr. & Gray - A; AB-4567; MGP
D. reptans (Lam.) Fern. - A; AB-4566; MGP
Lepidium densiflorum Schrad.* - A; AB-5193; DAOF
L. oblongum Small - P; AB-4564; DAOF
Lesquerella gordonii (Gray) S. Wats. - A; AB-4562; MGP
Rorippa nasturtium-aquaticum (L.) Hayek* - P; AB-5114; WETL

Cactaceae
Echinocereus reichenbachii (Terscheck ex Walp.) Haage f. - P; AB-4550a; MGP
Escobaria vivipara (Nutt.) Buxbaum - P; AB-4821; MGP
Opuntia humifusa (Raf.) Raf. - P; AB-6303; MGP
O. lindheimeri Engelm. - P; AB-6019; MGP
O. phaeacantha Engelm. - P; AB-5195; MGP

Capparaceae
Cleome serrulata Pursh - A; AB-4827; MGP
Polanisia dodecandra (L.) DC. - A; AB-5091; MGP

Caprifoliaceae
Symphoricarpos orbiculatus Moench - P; AB-5177; MGP

Caryophyllaceae
Arenaria serpyllifolia L.* - A; AB-4562; OF
Cerastium pumilum W. Curtis* - A; AB-4563; OF
Paronychia jamesii Torr. & Gray - P; AB-5092; MGP

Chenopodiaceae
Chenopodium album L. - A; AB-6011; DAOF
C. pratericola Rydb. - A; AB-4829; DAOF
Salsola tragus L.* - A; AB-6450; DAOF

Convolvulaceae
Evolvulus nuttallianus J.A. Schultes - P; AB-4778; MGP
Ipomoea leptophylla Torr. - P; AB-5109; MGP

Cucurbitaceae
Cucurbita foetidissima Kunth - P; AB-5108; DAOF, MGP
Cyclanthera dissecta (Torr. & Gray) Arn. - A; AB-6131; MGP

Euphorbiaceae
Acalypha ostryifolia Riddell - A; AB-5175; DAOF
Chamaesyce albomarginata (Torr. & Gray) Small - P; AB-6451; MGP
C. carunculata (Waterfall) Shinners - A; AB-4569; DAOF
C. glyptosperma (Engelm.) Small - A; AB-6449; DAOF
C. missurica (Raf.) Shinners - A; AB-6122; MGP
C. prostrata (Ait.) Small - A; AB-6003; DAOF
C. serpens (Kunth) Small - A; AB-6004; DAOF, MGP
Croton glandulosus L. - A; AB-5121; DAOF
C. monanthogynus Michx. - A; AB-5192; MGP
C. texensis (Klotzsch) Muell.- Arg. - A; AB-4819; MGP
Euphorbia dentata Michx. - A; AB-5173, DAOF
E. marginata Pursh - A; AB-5166; MGP
E. spathulata Lam. - A; AB-4565; MGP

Fabaceae
Amorpha fruticosa L. - P; AB-5120; WETL
Astragalus canadensis L. - P; AB-4833; MGP
A. missouriensis Nutt. - P; AB-4832; MGP
Caesalpinia jamesii (Torr. & Gray) Fisher - P; AB-5110; MGP
Dalea aurea Nutt. ex Pursh - P; AB-5107; MGP
D. enneandra Nutt - P; AB-5111; MGP
D. purpurea Vent. - P; AB-5104; MGP
Indigofera miniata Ortega - P; AB-5106; MGP
Melilotus officinalis (L.) Lam.* - B; AB-5103; DAOF
Mimosa nuttallii (DC.) B.L. Turner - P; AB-4739; MGP
Pediomelum cuspidatum (Pursh) Rydb. - P; AB-4755; MGP
P. linearifolium (Torr. & Gray) J. Grimes - P; AB-4822; DAOF
Prosopis glandulosa Torr. - P; AB-5169; DAOF: MGP
Vicia americana Muhl. ex Willd. - P; AB-4572; DAOF, MGP

Fagaceae
Quercus macrocarpa Michx. - P; AB-4551; DAOF, MGP
Q. muehlenbergii Engelm. - P: AB-4551a; MGP

Fumariaceae
Corydalis curvisiliqua Engelm. - A; AB-4573; MGP

Grossulariaceae
Ribes aureum Pursh - P; AB-4770; MGP

Hydrophyllaceae
Nama stevensii C. L. Hitchc. - A; AB-4575; MGP
Phacelia integrifolia Torr. - A; AB-5090; MGP

Juglandaceae
Juglans microcarpa Berl. - P; AB-4560; DAOF, MGP

Krameriaceae
Krameria lanceolata Torr - P; AB-5119; MGP

Lamiaceae
Lamium purpureum L.* - A; AB-4557; DAOF
Monarda clinopodioides Gray - A; AB-4828; MGP

Linaceae
Linum pratense (J.B.S. Norton) Small - A; AB-4577; MGP
L. rigidum Pursh - A; AB-4578; MGP

Loasaceae
Mentzelia nuda (Pursh) Torr. & Gray - P; AB-5100; MGP
M. oligosperma Nutt. ex Sims - P; AB-5172; MGP

Malvaceae
Callihroe involucrata (Torr. & Gray) Gray - P; AB-4561; MGP
C. leiocarpa R.F. Martin - P; AB-6121; MGP
Sphaeralcea coccinea (Nutt.) Rydb. - P; AB-4570; MGP

Molluginaceae
Mollugo verticillata L. - A; AB-6141; DAOF

Moraceae
Morus alba L.* - P; AB-5089; DAOF

Nyctaginaceae

Mirabilis linearis (Pursh) Heimerl - P; AB-6444; MGP

Onagraceae
Calylophus hartwegii (Bent.) Raven - P; AB-6006; MGP
C. serrulatus (Nutt.) Raven - P; AB-6124; MGP
Gaura coccinea Nutt. ex Pursh - P; AB-5184; MGP
G. mollis James - A; AB-5186; DAOF
G. villosa Torr. - P; AB-4759; MGP
Oenothera biennis L. - B; AB-6456; DAOF
O. laciniata Hill - P; AB-4743; DAOF, MGP
Stenosiphon linifolius (Nutt. ex James) Heynh. - P; AB-6440; MGP

Oxalidaceae
Oxalis stricta L. - P; AB-4559; DAOF, MGP
O. violacea L. - P; AB-4566; MGP

Papaveraceae
Argemone polyanthemos (Fedde) G.B. Ownbey - A; AB-6448; DAOF, MGP

Plantaginaceae
Plantago patagonica Jacq. - A; AB-4766; DAOF, MGP
P. rhodosperma Dcne. - A; AB-4762; DAOF, MGP
P. virginica L. - A; AB-4568; DAOF

Polygalaceae
Polygala alba Nutt. - P; AB-5163; MGP

Polygonaceae
Eriogonum annuum Nutt. - A; AB-5178; MGP
Polygonum lapathifolium L. - A; AB-6298; WETL
P. tenue Michx. - P; AB-5068; DAOF
Rumex crispus L.* - P; AB-5080; WETL

Portulacaceae
Portulaca oleracea L. - A; AB-6300; DAOF
P. pilosa L. - A; AB-6299; DAOF

Primulaceae
Samolus valerandi L. - P; AB-5081; WETL
Ranunculaceae
Delphinium carolinianum Walt. ssp. *virescens* (Nutt.) Brooks - P; AB-4760; MGP
Ranunculus abortivus L. - P; AB-5086; WETL
R. sceleratus L. - A; AB-6442; WETL

Rosaceae
Prunus angustifolia Marsh. - P; AB-4744; DAOF

Rubiaceae
Hedyotis nigricans (Lam.) Fosberg - P; AB-5105; MGP

Salicaceae
Populus deltoides Bartr. ex Marsh. - P; AB-5112; WETL
Salix nigra Marsh - P; AB-5079; WETL

Santalaceae
Comandra umbellata (L.) Nutt. - P; AB-4573; MGP

Sapindaceae
Sapindus saponaria L. - P; AB-4746; DAOF, MGP

Sapotaceae
Sideroxylon lanuginosum Michx. - P; AB-4738; DAOF, MGP

Scrophulariaceae
Castilleja purpurea (Nutt.) G.Don var. *citrina* (Pennell) Shinners - P; AB-4571; MGP
Penstemon cobaea Nutt - P; AB-4740; MGP
Veronica arvensis L.* - A; AB-4558; DAOF, MGP

Solanaceae
Physalis cinerascens (Dunal) A.S. Hitchc. - P; AB-4767; MGP
Quincula lobata (Torr.) Raf. - P; AB-4573; DAOF, MGP
Solanum dimidiatum Raf. - A; AB-5082; DAOF, MGP
S. elaeagnifolium Cav. - P; AB-6120; DAOF, MGP
S. rostratum Dunal - P; AB-6134; DAOF

Tamaricaceae
Tamarix chinensis Lour.* - P; AB-4818; WETL

Ulmaceae
Celtis laevigata Willd. var. *reticulata* (Torr.) L. - P; AB-6132; DAOF, MGP
Ulmus americana L. - P; AB-4820; DAOF, MGP
U. pumila L.* - P; AB-6452; DAOF, MGP

Urticaceae
Parietaria pensylvanica Muhl. ex Willd. - A; AB-4563; DAOF

Verbenaceae
Glandularia bipinnatifida (Nutt.) Nutt. - A; AB-4763; MGP
G. pumila (Rydb.) Umber - A; AB-4763; DAOF
Phyla lanceolata (Michx.) Greene - P; AB-5084; WETL
Verbena bracteata; Lag. & Rodr. - P; AB-5071; MGP

Violaceae
Hybanthus verticillatus (Ortega) Baill. - P; AB-4579; MGP
Viola bicolor Pursh - A; AB-4556; DAOF, MGP

Vitaceae
Cissus trifoliata (L.) L. - P; AB-4754; MGP
Vitis acerifolia Raf. - P; AB-4775; DAOF, MGP
V. riparia Michx. - P; AB-6116; WETL

LILIOPSIDA
Agavaceae
Yucca glauca Nutt. - P; AB-4769; MGP, DAOF

Commelinaceae
Commelina erecta L. - P; AB-4826; MGP, DAOF
Tradescantia occidentalis (Britt.) Smyth - P; AB-4576; MGP

Cyperaceae
Carex gravida Bailey - P; AB-4524; MGP
Cyperus schweinitzii Torr. - P; AB-5196; MGP
Eleocharis palustris (L.) Roemer & J.A. Schultes - P; AB-5078; WETL
Schoenoplectus pungens (Vahl) Palla - P; AB-5075; WETL

Juncaceae
Juncus torreyi Coville - P; AB-5074; WETL

Lemnaceae
Lemna minor (L.) - A; AB-4552a; WETL

Liliaceae
Allium drummondii Regel - P; AB-4568; MGP, DAOF

Poaceae
Andropogon gerardii Vitman - P; AB-6142; MGP
Aristida purpurea Nutt. - P; AB-5087, AB-6001; MGP
Bothriochloa ischaemum (L.) Keng* - P; AB-6000; MGP
B. laguroides (DC.) Herter - P; AB-5076; MGP
Bouteloua curtipendula (Michx.) Torr. - P; AB-5102; MGP
B. gracilis (Willd. ex Kunth) Lag. ex Griffiths - P; AB-6002; MGP
Bromus catharticus Vahl* - A; AB-4553; DAOF
B. tectorum L.* - A; AB-4555; DAOF
Buchloe dactyloides (Nutt.) Engelm. - P; AB-4564; MGP
Cenchrus spinifex Cav. - P; AB-5197; WETL
Chloris verticillata Nutt. - P; AB-5168; DAOF
Cynodon dactylon (L.) Pers.* - P; AB-5180; DAOF
Dichanthelium oligosanthes (J.A. Schultes) Gould - P; AB-4758; MGP
Digitaria ciliaris (Retz.) Koel. - A; AB-6126; DAOF
Echinochloa muricata (Beauv.) Fern.* - A; AB-5199; WETL
Eleusine indica (L.) Gaertn.* - A; AB-6113; DAOF
Elymus canadensis L. - P; AB-5170; DAOF, WETL
E. virginicus L. - P; AB-5093; WETL
Eragrostis cilianensis (A.) Vign. ex Janchen* - A; AB-6445; DAOF
Eriochloa contracta A.S. Hitchc.- A; AB-6138; WETL
Erioneuron pilosum (Buckl.) Nash - P; AB-5164; MGP
Hordeum pusillum Nutt. - A; AB-4554; MGP, OF
Panicum capillare L. - A; AB-6130; MGP
P. obtusum Kunth - P; AB-5083; WETL
P. virgatum L. - P; AB-6013; MGP, WETL
Pascopyrum smithii (Rydb.) A. Love - P; AB-5117; DAOF
Phalaris caroliniana Walt. - A; AB-5085; WETL
Poa arachnifera Torr - P; AB-4573; DAOF
P. arida Vasey - P; AB-6461; DAOF, MGP
Polypogon monspeliensis (L.) Desf.* - A; AB-5118; WETL
Schizachyrium scoparium (Michx.) Nash - P; AB-6128; MGP
Setaria parviflora (Poir.) Kerguelen - P; AB-5198; DAOF
S. pumila (Poir.) Roemer & J. A. Schultes* - A; AB-5094; DAOF
Sorghastrum nutans (L.) Nash - P; AB-6140; MGP
Sphenopholis obtusata (Michx.) Scribn. - P; AB-6462; WETL
Sporobolus compositus (Poir.) Merr. - P; AB-6119; DAOF, MGP
S. cryptandrus (Torr.) Gray - P; AB-6014; DAOF, MGP
Tridens albescens (Vasey) Woot. & Standl. - P; AB-6137; DAOF
T. flavus (L.) A.S. Hitchc. - P; AB-6015; MGP
Vulpia bromoides (L.) S.F. Gray* - A; AB-4817; DAOF

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