

Vascular flora and historic vegetation of Washita Battlefield National Historic Site, Roger  
Mills County, Oklahoma

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## INTRODUCTION

The primary objective of this study was to fill a floristic data gap for western Oklahoma. Prior to 2002, the year collecting began for this study, 446 specific and sub-specific taxa were reported from Roger Mills County (Hoagland 2003). Botanical study of Roger Mills County began on 3 July 1919, when J. Engleman collected *Erigeron bellidiastrum* Nutt. There are no records of additional collections until 1929. Peak collecting years in Roger Mills County were 1939 (261 specimens) as result of the work of J. Engleman and 1976 as a result of Susan Barber and Rahmona Thompson (124 specimens; Hoagland 2004). Recently, Freeman et al. (2002) inventoried a ranch in Roger Mills County to the south of WBNHS. This inventory was also initiated to aid resource managers at the Washita Battlefield National Historic Site (WBNHS). Such research locates populations of sensitive species and noting the arrival of exotic and nuisance species (Barkley 2000).

### Historical vegetation

A number of approaches can be used to reconstruct historic patterns of wetland distribution. One is the use of written accounts prepared by early explorers and tourists of their adventures. Although lists of species encountered and vague descriptions of vegetation is often provided, this information is insufficient for quantitative analysis of species composition and abundance. The most useful tool in this regard is the plats and notes prepared by the General Land Office (GLO) Surveyors in the nineteenth century. The first survey of what is now Oklahoma was conducted in 1871 and included

Oklahoma Territory and the Chickasaw Nation. Lands held by the Choctaw, Creek, Seminole, and Cherokee Nations, including tribes relocated to northeast Oklahoma, were not surveyed at that time, however. In the 1890's, all of Oklahoma was included in a resurvey. Survey data for 1871 provide the best glimpse available of the distribution and abundance of Oklahoma wetlands prior to extensive settlement.

## **METHODS**

### **Floristic inventory**

Eight collection sites were established at WBNHS for intensive floristic sampling. Sites were selected following a review of US Geological Survey 1:24,000 topographic maps and field reconnaissance. The predominant vegetation association at these sites was classified according to Hoagland (2000). Collections also were made randomly throughout the WBNHS from March through October 1997. Vouchers for species exotic to North America 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 used for specimen identification included Correll and Johnston (1970), Gould (1975), Waterfall (1969) and Great Plains Flora Association (1986). Origin, whether native to introduced to North America, was determined using Taylor and Taylor (1991) and the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS 2003). Nomenclature follows USDA-NRCS (2003). Voucher

specimens were deposited at OKL. Voucher specimens were deposited at OKL.

### **Historical vegetation**

Analyses were conducted to ascertain the spatial distribution of land cover types at WABA. In order to do so, the 1871 township plat containing WABA was digitized using ArcInfo GIS. Plats were obtained from the Archives branch of the Oklahoma Department of Libraries in Oklahoma City. All information digitized from a plat was attributed to one of the following data layers: vegetation (forest, grassland, and wetland), hydrology (streams, rivers, springs, and ponds), agriculture (cultivated fields), transportation (roads, trails, and railroads), and settlement (residences, schools, and other cultural features). Once a township had been digitized, each data layer was edited, attributed, and joined with adjacent plats.

FRAGSTATS (McGarigal and Marks, 1994), a landscape ecology software package, was used to determine landscape composition, defined here as the number of occurrences and area occupied by each land cover type. FRAGSTATS indices used in this study were class area, number of patches, and mean patch size. Class area is a measure of the total area occupied by a particular landcover type. Number of patches is a measure of individual occurrences of a given land cover type. Mean patch size averages the area occupied by each land cover (McGarigal and Marks, 1994).

## **RESULTS AND DISCUSSION**

### **Floristic inventory**

A total of 272 vascular plants in 201 genera and 62 families were collected. Among the angiosperms, 67 were monocots and 204 were dicots. One gymnosperm

was found. The most species were collected from the families Poaceae (54), Asteraceae (48), Fabaceae (22), and Euphorbiaceae (13). The genera *Chamaesyce* (5), *Eragrostis* (4), *Dalea* (4), and *Solanum* (4) had the most species. 594 species were annual or biennials, and 178 perennial. 32 species of trees, shrubs, and vines were present.

Thirty-two exotic species from 14 families were collected, representing 11.8% of the flora. The greatest number of exotic species were in the families Poaceae (11) and Asteraceae (4). The percentage of exotics in the WBNHS flora is comparable to recent floristic inventories in Oklahoma. For example, a flora of the Chickasaw National Recreation Area reported 12% exotic species (Hoagland and Johnson 2001), 9% at Oologah Wildlife Management Area (Hoagland and Wallick 2003), 15% at Keystone Wildlife Management Area, and 11% for an inventory of Tillman County (Hoagland et al., in press). However, the percentage was lower, 6.6%, at Red Slough and Grassy Slough in southeastern Oklahoma (Hoagland and Johnson, in press). Five species tracked by the Oklahoma Natural Heritage Inventory were found: *Argythamnia humilis* (G5S2S3), *Gaura brachycarpa* (G4G5 S1S2), *Solanum triflorum* (G5S1S2), *Sporobolus giganteus* (G5S1S3), and *Zinnia grandiflora* (G5S?). Species are ranked according to level of imperilment at the state (S) and global (G) levels on a scale of 1\_5; 1 representing a species that is imperiled and 5 one that is secure (Groves et al, 1995).

As a result of this study, 651 species are now known to occur in Roger Mills County. Of the 361 species reported in this study, 156 had been previously collected in Roger Mills County (Hoagland 2004). This study documented 205 species not

previously reported from Roger Mills County.

When compared with the Dempsey Divide site (Freeman et al. 2002), there were 219 species found at both sites. However, 53 species were documented at WBNHS that were not reported at Dempsey Divide. 251 additional species were found on the Dempsey Divide that were not found at the WBNHS. This discrepancy is no doubt a result of difference of aerial extent and number of habitats at the two sites.

The 3 collection sites occurred within four vegetation associations. A brief description of each follows:

*Quercus stellata*\_ *Quercus marilandica*\_ *Carya texana* forest association

This association occurred on uplands with deep sands. It was limited in extent. Associated species include: *Aesculus glabra*, *Cercis canadensis*, *Helianthus hirsutus*, *Juglans nigra*, *Monarda punctata*, *Prunus mexicana*, *Symphoricarpos orbiculatus*, *Viburnum rufidulum*, and *Schizachyrium scoparium*.

*Schizachyrium scoparium* \_ *Bouteloua hirsuta* herbaceous association

Occurred on Permian red sandstone in the uplands overlain by the Woodward-Quinlan soil association. Associated species included *Aristida oligantha*, *Artemisia psiolstachya*, *Bouteloua curtipendula*, *Eriogonum annuum*, *Penstemon albidus*, *Sphaeralcea coccinea*, *Thelesperma megapotamicum*, and *Yucca glauca*.

## Wetland and aquatic vegetation

Wetlands were limited to manmade ponds, a spring, and some seeps. As a result, it was difficult to classify wetlands into specific vegetation associations.

Therefore, all wetland habitats have been assigned to this category. At the seeps and springs, the most were *Marsilea vestita*, *Rorippa nasturtium-aquaticum*, *Hydrocotyle verticillata*, *Spirodela polyrhiza*, and *Lemna minor*.

Most of the vegetation in man-made ponds were in the *Typha* (*angustifolia*, *domingensis*) herbaceous association. Associated species included *Amorpha fruticosa*, *Andropogon glomeratus*, *Carex crus-crovi*, *Cephalanthus occidentalis*, *Ludwigia peploides*, *Pluchea odorata*, *P. lappaceum*, and *Salix nigra*.

## Disturbed areas and old-field vegetation

This includes much of the Washita River floodplain, which had been under cultivation for many years. Also includes roadsides and areas visited by WBNHS visitors and other areas exhibiting signs of physical disruption. Common plants in disturbed areas and old fields included *Ambrosia trifida*, *Bothriochloa ischaemum*, *Chenopodium simplex*, *Cynodon dactylon*, *Digitaria ciliaris*, *Melilotus officinalis*, and *Sorghum halepense*.

## Historical vegetation

Only two land cover types occurred at what would become WABA in 1871 (figure 1). Riparian areas covered 18.7 acres and grasslands 316.7 acres. No settlements or

cultivated land was mapped. Although the surveyors noted on the plat that this was the location of Custer's encounter with the Cheyenne, the precise location was not mapped.

### **ACKNOWLEDGMENTS**

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## Flora of the Washita Battlefield National Historic Site

**F or H=Forb or herb; G=Graminoid; S=Shrub; T=Tree; V=Vine**

**A=Annual; B=Biennial; P=Perennial**

**N=Native to U.S.; I=Introduced to U.S.**

**DA=disturbed area; MGP=mixed grass prairie; OF=old field; RA=riparian area;**

**SW=sandy woodland**

### Gymnosperms

#### **Cupressaceae**

*Juniperus virginiana* L.

eastern redcedar; T, P, N

SW

### Monocotyledonae

#### **Agavaceae**

*Yucca glauca* Nutt.

soapweed yucca; S, P, N

MGP

#### **Commelinaceae**

*Commelina erecta* L.

whitemouth dayflower; F or H, P, N

MGP

*Tradescantia occidentalis* (Britt.) Symth

prairie spiderwort, F or H, P, N

MGP

#### **Cyperaceae**

*Carex gravida* Bailey

heavy sedge; G, P, N

MGP

*Cyperus odoratus* L.

fragrant flatsedge; G, A, N

MGP

*Cyperus schweinitzii* Torr.

Schweinitz's flatsedge; G, P, N

MGP

*Cyperus setigerus* Torr. & Hook.

lean flatsedge; G, P, N  
RA

*Fimbristylis vahlii* (Lam.) Link  
Vahl's fimbry; G, A, N  
RA

*Schoenoplectus pungens* (Vahl) Pall  
common threesquare; G, P, N  
RA

### **Iridaceae**

*Sisyrinchium angustifolium* P. Mill.  
narrowleaf blue-eyed grass; F or H, P, N  
MGP

### **Juncaceae**

*Juncus torreyi* Coville  
Torrey's rush; G, P, N  
RA

### **Liliaceae**

*Allium canadense* L.  
meadow garlic; F or H, P, N  
MGP

*Allium drummondii* Regel  
Drummond's onion; F or H, P, N  
MGP

### **Poaceae**

*Andropogon hallii* Hack.  
sand bluestem; G, P, N  
OF

*Aristida oligantha* Michx.  
prairie threeawn; G, A, N  
MGP

*Aristida purpurea* Nutt.  
purple threeawn; G, P, N  
MGP

*Bothriochloa ischaemum* (L.) Keng  
yellow bluestem; G, P, I  
MGP

*Bothriochloa laguroides* (DC.) Herter  
silver beardgrass; G, P, N  
MGP

*Bouteloua curtipendula* (Michx.) Torr.  
sideoats grama; G, P, N

MGP  
*Bouteloua gracilis* (Willd. ex Kunth) Lag. ex Griffiths  
 blue grama; G, P, N  
 DA, MGP

*Bouteloua hirsuta* Lag.  
 hairy grama; G, P, N  
 DA

*Bromus japonicus* Thunb. ex Murr.  
 Japanese brome; G, A, I  
 MGP

*Buchloe dactyloides* (Nutt.) Engelm.  
 buffalograss; G, P, N  
 DA

*Cenchrus spinifex* Cav.  
 coastal sandbur; G, P, N  
 SW

*Chloris verticillata* Nutt.  
 tumble windmill grass; G, P, N  
 MGP, DA

*Cynodon dactylon* (L.) Pers.  
 Bermudagrass; G, P, I  
 MGP

*Dichanthelium malacophyllum* (Nash) Gould  
 softleaf rosette grass; G, P, N  
 MGP

*Dichanthelium oligosanthes* (J.A. Schultes) Gould  
 Heller's rosette grass; G, P, N  
 MGP

*Digitaria ciliaris* (Retz.) Koel.  
 southern crabgrass; G, P, N  
 DA

*Digitaria cognata* (J.A. Schultes) Pilger  
 Carolina crabgrass; G, P, N  
 MGP

*Distichlis spicata* (L.) Greene  
 inland saltgrass; G, P, N  
 OF

*Echinochloa crus-galli* (L.) Beauv.  
 barnyardgrass; G, A, I  
 RA

*Elymus canadensis* L.  
 Canada wildrye; G, P, N  
 MGP

*Elymus virginicus* L.  
 Virginia wildrye; G, P, N

RA  
*Eragrostis barrelieri* Daveau  
 Mediterranean lovegrass; G, A, I  
 DA  
*Eragrostis cilianensis* (All.) Vign. ex Janchen  
 stinkgrass; G, A, I  
 DA  
*Eragrostis curvula* (Schrad.) Nees  
 weeping lovegrass; G, P, I  
 MGP  
*Eragrostis spectabilis* (Pursh) Steud.  
 purple lovegrass; G, P, N  
 SW  
*Erioneuron pilosum* (Buckl.) Nash  
 hairy woollygrass; G, P, N  
 MGP  
*Hordeum pusillum* Nutt.  
 little barley; G, A, N  
 DA  
*Leptochloa fusca* (L.) Kunth ssp. *fascicularis* (Lam.) N. Snow  
 bearded sprangletop; G, A, N  
 RA  
*Lolium perenne* L.  
 perennial ryegrass; G, P, I  
 MGP  
*Muhlenbergia asperifolia* (Nees & Meyen ex Trin.) Parodi  
 scratchgrass; G, P, N  
 SW  
*Muhlenbergia racemosa* (Michx.) B.S.P.  
 marsh muhly; G, P, N  
 MGP  
*Muhlenbergia sobolifera* (Muhl. ex Willd.) Trin.  
 rock muhly; G, P, N  
 MGP  
*Panicum capillare* L.  
 witchgrass; G, A, N  
 MGP  
*Panicum obtusum* Kunth  
 vine mesquite; G, P, N  
 OF  
*Panicum virgatum* L.  
 switchgrass; G, P, N  
 MGP  
*Pascopyrum smithii* (Rydb.) A. Love  
 western wheatgrass; G, P, N

OF  
*Paspalum setaceum* Michx.  
 thin paspalum; G, P, N  
 OF  
*Poa arachnifera* Torr.  
 Texas bluegrass; G, P, N  
 OF  
*Saccharum giganteum* (Walt.) Pers.  
 sugarcane plumegrass; G, P, N  
 OF  
*Schedonnardus paniculatus* (Nutt.) Trel.  
 tumblegrass; G, P, N  
 OF  
*Schizachyrium scoparium* (Michx.) Nash  
 little bluestem; G, P, N  
 OF  
*Setaria parviflora* (Poir.) Kerguelen  
 marsh bristlegrass; G, P, N  
 OF  
*Setaria viridis* (L.) Beauv.  
 green bristlegrass; G, A, I  
 MGP  
*Sorghastrum nutans* (L.) Nash  
 indiangrass; G, P, N  
 OF  
*Sorghum halepense* (L.) Pers.  
 Johnsongrass; G, P, I  
 MGP  
*Spartina pectinata* Bosc ex Link  
 prairie cordgrass; G, P, N  
 RA  
*Sporobolus cryptandrus* (Torr.) Gray  
 sand dropseed; G, P, N  
 SW  
*Sporobolus giganteus* Nash  
 giant dropseed; G, P, N  
 MGP  
*Sporobolus vaginiflorus* (Torr. ex Gray) Wood  
 poverty dropseed; G, A, N  
 SW  
*Tridens flavus* (L.) A.S. Hitchc.  
 purpletop tridens; G, P, N  
 OF  
*Triplasis purpurea* (Walt.) Chapman  
 purple sandgrass; G, A, N

MGP

*Triticum aestivum* L.

common wheat; G, A, I

OF

*Vulpia octoflora* (Walt.) Rydb.

sixweeks fescue; G, A, N

MGP

## **Dicotyledonae**

### **Amaranthaceae**

*Amaranthus albus* L.

prostrate pigweed; F or H, A, N

MGP

*Amaranthus palmeri* S. Wats.

carelessweed; F or H, A, N

OF

*Froelichia gracilis* (Hook.) Moq.

slender snakecotton; F or H, A, N

SW

### **Anacardiaceae**

*Rhus aromatica* L.

fragrant sumac; S, P, N

MGP

*Rhus glabra* L.

smooth sumac; S, P, N

MGP

*Toxicodendron radicans* (L.) Kuntze

eastern poison ivy; S or V, P, N

RA

### **Apiaceae**

*Chaerophyllum tainturieri* Hook.

hairyfruit chervil; F or H, A, N

MGP

*Cymopterus macrorhizus* Buckl.

bigroot springparsley; F or H, P, N

MGP

### **Apocynaceae**

*Apocynum cannabinum* L.

indianhemp; F or H, P, N

SW

### **Asclepiadaceae**

- Asclepias arenaria* Torr.  
sand milkweed; F or H, P, N  
MGP, SW
- Asclepias asperula* (Dcne.) Schlechter  
spider milkweed; F or H, P, N  
MGP
- Asclepias stenophylla* Gray  
slimleaf milkweed; F or H, P, N  
MGP
- Asclepias syriaca* L.  
common milkweed; F or H, P, N  
MGP
- Funastrum cynanchoides* (Dcne.) Schlechter  
fringed twinevine; F or H, P, N  
SW

### **Asteraceae**

- Ambrosia psilostachya* DC.  
Cuman ragweed; F or H, P, N  
MGP
- Ambrosia trifida* L.  
great ragweed; F or H, A, N  
MGP
- Amphiachyris dracunculoides* (DC.) Nutt.  
prairie broomweed; F or H, A, N  
MGP
- Aphanostephus skirrhobasis* (DC.) Trel.  
Arkansas dozedaisy; F or H, A, N  
MGP
- Artemisia dracunculus* L.  
tarragon; F or H, P, N  
MGP
- Artemisia filifolia* Torr.  
sand sagebrush; S, P, N  
OF
- Artemisia ludoviciana* Nutt.  
white sagebrush; F or H, P, N  
MGP
- Baccharis salicina* Torr. & Gray  
Great Plains false willow; S, P, N  
RA
- Brickellia eupatorioides* (L.) Shinnery  
false boneset; F or H, P, N  
MGP

*Chaetopappa ericoides* (Torr.) Nesom  
 rose heath; F or H, P, N  
 MGP

*Cirsium undulatum* (Nutt.) Spreng.  
 wavyleaf thistle; F or H, P, N  
 MGP

*Cirsium vulgare* (Savi) Ten.  
 bull thistle; F or H, B, I  
 MGP

*Conyza canadensis* (L.) Cronq.  
 Canadian horseweed; F or H, A, N  
 OF

*Eclipta prostrata* (L.) L.  
 false daisy; F or H, A, N  
 RA

*Engelmannia peristenia* (Raf.) Goodman & Lawson  
 Engelmann's daisy; F or H, P, N  
 MGP

*Erigeron bellidiastrum* Nutt.  
 western daisy fleabane; F or H, A, N  
 MGP, SW

*Eupatorium serotinum* Michx.  
 lateflowering thoroughwort; F or H, P, N  
 RA

*Euthamia gymnospermoides* Greene  
 Texas goldentop; F or H, P, N  
 OF

*Gaillardia pulchella* Foug.  
 firewheel; F or H, A, N  
 MGP

*Gaillardia suavis* (Gray & Engelm.) Britt. & Rusby  
 perfumeballs; F or H, P, N  
 MGP

*Grindelia papposa* Nesom & Suh  
 Spanish gold; F or H, A, N  
 MGP

*Helianthus annuus* L.  
 common sunflower; F or H, A, N  
 OF

*Helianthus maximiliani* Schrad.  
 Maximilian sunflower; F or H, P, N  
 OF

*Helianthus petiolaris* Nutt.  
 prairie sunflower; F or H, A, N  
 OF

*Heterotheca subaxillaris* (Lam.) Britt. & Rusby  
 camphorweed; F or H, A, N  
 MGP

*Heterotheca villosa* (Pursh) Shinnars  
 hairy false goldenaster; F or H, P, N  
 MGP

*Hymenopappus flavescens* Gray  
 collegeflower; F or H, B, N  
 MGP

*Iva annua* L.  
 annual marshelder; F or H, P, N  
 OF, RA

*Lactuca serriola* L.  
 prickly lettuce; F or H, A, I  
 MGP

*Liatris pycnostachya* Michx.  
 prairie blazing star; F or H, P, N  
 MGP

*Lygodesmia juncea* (Pursh) D. Don ex Hook.  
 rush skeletonplant; For H, P, N  
 MGP

*Machaeranthera pinnatifida* (Hook.) Shinnars  
 lacy tansyaster; F or H, P, N  
 MGP

*Pluchea odorata* (L.) Cass. var. *odorata*  
 sweetscent; F or H, A, N  
 RA

*Ratibida columnifera* (Nutt.) Woot. & Standl.  
 upright prairie coneflower; F or H, P, N  
 MGP

*Solidago canadensis* L.  
 Canada goldenrod; F or H, P, N  
 OF

*Solidago gigantea* Ait.  
 giant goldenrod; F or H, P, N  
 OF

*Solidago petiolaris* Ait.  
 downy ragged goldenrod; F or H, P, N  
 MGP

*Symphotrichum ericoides* (L.) Nesom  
 white heath aster; F or H, P, N  
 OF

*Symphotrichum oblongifolium* (Nutt.) Nesom  
 aromatic aster; F or H, P, N  
 MGP

- Symphotrichum subulatum* (Michx.) Nesom  
eastern annual saltmarsh aster; F or H, A, N  
RA
- Taraxacum officinale* G.H. Weber ex Wiggers  
common dandelion; F or H, P, I  
DA
- Tetraneuris scaposa* (DC.) Greene  
stemmy four-nerve daisy; F or H, P, N  
MGP
- Thelesperma megapotamicum* (Spreng.) Kuntze  
Hopi tea greenthread; F or H, P, N  
MGP
- Tragopogon dubius* Scop.  
yellow salsify; F or H, A, I  
OF
- Verbesina encelioides* (Cav.) Benth. & Hook. f. ex Gray  
golden crownbeard; F or H, A, N  
OF
- Vernonia baldwinii* Torr.  
Baldwin's ironweed; F or H, P, N  
OF
- Xanthium strumarium* L.  
rough cocklebur; F or H, A, N  
RA
- Zinnia grandiflora* Nutt.  
Rocky Mountain zinnia; F or H, P, N  
MGP

### **Boraginaceae**

- Heliotropium convolvulaceum* (Nutt.) Gray  
phlox heliotrope; F or H, A, N  
SW
- Lithospermum incisum* Lehm.  
narrowleaf stoneseed; F or H, P, N  
MGP

### **Brassicaceae**

- Camelina rumelica* Velen.  
graceful false flax; F or H, A, N  
MGP
- Capsella bursa-pastoris* (L.) Medik.  
shepherd's purse; F or H, A, N  
DA
- Descurainia pinnata* (Walt.) Britt.  
western tansymustard; F or H, A, N

MGP

*Dimorphocarpa candicans* (Raf.) Rollins  
Palmer's spectacle pod; F or H, A, N  
SW

*Draba reptans* (Lam.) Fern.  
Carolina draba; F or H, A, N  
MGP

*Lepidium oblongum* Small  
veiny pepperweed; F or H, A, N  
MGP

*Lesquerella gordonii* (Gray) S. Wats.  
F or H, A, N  
MGP

### **Cactaceae**

*Escobaria vivipara* (Nutt.) Buxbaum  
spiny star; F or H, P, N  
MGP

*Opuntia macrorhiza* Engelm.  
twist spine prickly pear; F or H, P, N  
MGP

### **Campanulaceae**

*Triodanis holzingeri* McVaugh  
Holzinger's Venus' looking-glass; F or H, A, N  
MGP

### **Caryophyllaceae**

*Arenaria serpyllifolia* L.  
thyme leaf sandwort; F or H, A, I  
DA

*Paronychia jamesii* Torr. & Gray  
James' nailwort; F or H, P, N  
MGP

*Stellaria media* (L.) Vill.  
common chickweed; F or H, A, I  
DA

### **Chenopodiaceae**

*Chenopodium album* L.  
lambsquarters; F or H, A, I  
MGP

*Chenopodium simplex* (Torr.) Raf.  
maple leaf goosefoot; F or H, A, N  
MGP

*Cycloloma atriplicifolium* (Spreng.) Coult.  
winged pigweed; F or H, A, N  
MGP

*Kochia scoparia* (L.) Schrad.  
Mexican-fireweed; F or H, A, I  
MGP

### **Convolvulaceae**

*Convolvulus arvensis* L.  
field bindweed; F or H, P, I  
MGP

*Evolvulus nuttallianus* J. A. Schultes  
shaggy dwarf morning-glory; F or H, P, N  
MGP

*Ipomoea leptophylla* Torr.  
bush morning-glory; F or H, P, N  
MGP

### **Cucurbitaceae**

*Cucurbita foetidissima* Kunth  
Missouri gourd; F or H, P, N  
MGP

*Cyclanthera dissecta* (Torr. & Gray) Arn.  
cutleaf cyclanthera; F or H, A, N  
SW

### **Euphorbiaceae**

*Acalypha ostryifolia* Riddell  
pineland threeseed mercury; F or H, A, N  
MGP

*Argythamnia humilis* (Engelm. & Gray) Muell.-Arg.  
low silverbush; F or H, P, N  
OF

*Chamaesyce fendleri* (Torr. & Gray) Small  
Fendler's sandmat; F or H, P, N  
MGP

*Chamaesyce glyptosperma* (Engelm.) Small  
ribseed sandmat; F or H, A, N  
MGP, SW

*Chamaesyce maculata* (L.) Small  
spotted sandmat; F or H, A, N  
OF

*Chamaesyce missurica* (Raf.) Shinnars  
prairie sandmat; F or H, A, N  
MGP, OF

*Chamaesyce stictospora* (Engelm.) Small  
slimseed sandmat; F or H, A, N  
DA, OF

*Croton glandulosus* L.  
vente conmigo; F or H, A, N  
MGP

*Croton texensis* (Klotzsch) Muell.-Arg.  
Texas croton; F or H, A, N  
MGP

*Euphorbia dentata* Michx.  
toothed spurge; F or H, A, N  
MGP

*Euphorbia hexagona* Nutt. ex Spreng.  
six-angled spurge; F or H, A, N  
MGP

*Euphorbia longicuris* Scheele  
wedgeleaf spurge; F or H, A, N  
MGP

*Euphorbia marginata* Pursh  
snow on the mountain; F or H, A, N  
OF

*Tragia ramosa* Torr.  
branched noseburn; F or H, P, N  
MGP

### **Fabaceae**

*Amorpha fruticosa* L.  
desert false indigo; S, P, N  
RA

*Astragalus lotiflorus* Hook.  
lotus milkvetch; F or H, P, N  
MGP

*Astragalus plattensis* Nutt.  
Platte River milkvetch; F or H, P, N  
MGP

*Baptisia australis* (L.) R. Br. ex Ait. f.  
blue wild indigo; F or H, P, N  
MGP

*Caesalpinia jamesii* (Torr. & Gray) Fisher  
James; holdback; F or H, P, N  
SW

*Cercis canadensis* L.  
eastern redbud; T, P, N  
OF

*Chamaecrista fasciculata* (Michx.) Greene

sleepingplant; F or H, A, N  
 MGP

*Dalea aurea* Nutt. ex Pursh  
 golden prairie clover; F or H, P, N  
 MGP

*Dalea candida* Michx. ex Willd.  
 white prairie clover; F or H, P, N  
 MGP

*Dalea enneandra* Nutt.  
 nineanther prairie clover; F or H, P, N  
 MGP

*Dalea purpurea* Vent.  
 violet prairie clover; F or H, P, N  
 MGP

*Desmodium illinoense* Gray  
 Illinois ticktrefoil; F or H, P, N  
 MGP

*Gleditsia triacanthos* L.  
 honeylocust; T, P, N  
 SW

*Gymnocladus dioicus* (L.) K. Koch  
 Kentucky coffeetree; T, P, N  
 SW

*Indigofera miniata* Ortega  
 coastal indigo; F or H, P, N  
 SW

*Medicago minima* (L.) L.  
 burr medick; F or H, A, I  
 DA

*Melilotus officinalis* (L.) Lam.  
 yellow sweetclover; F or H, A, I  
 DA

*Mimosa borealis* Gray  
 fragrant mimosa; S, P, N  
 MGP

*Mimosa nuttallii* (DC.) B.L. Turner  
 Nuttall's sensitive-briar; S, P, N  
 MGP

*Pediomelum linearifolium* (Torr. & Gray) J. Grimes  
 narrowleaf Indian breadroot; F or H, P, N  
 MGP

*Sophora nuttalliana* B.L. Turner  
 F or H, P, N  
 MGP

*Strophostyles leiosperma* (Torr. & Gray) Piper

F or H, A, N  
MGP

### **Fumariaceae**

*Corydalis micrantha* (Engelm. ex Gray) Gray  
smallflower fumewort; F or H, A, N  
MGP

### **Geraniaceae**

*Erodium cicutarium* (L.) L'Her. ex Ait.  
redstem stork's bill; F or H, A, I  
DA

*Geranium pusillum* L.  
small geranium; F or H, A, I  
MGP

### **Grossulariaceae**

*Ribes aureum* Pursh  
golden currant; S, P, N  
SW

### **Juglandaceae**

*Juglans microcarpa* Berl.  
little walnut; T, P, N  
SW

### **Krameriaceae**

*Krameria lanceolata* Torr.  
trailing krameria; F or H, P, N  
MGP

### **Lamiaceae**

*Lamium amplexicaule* L.  
henbit deadnettle; F or H, A, I  
DA

*Lycopus americanus* Muhl. ex W. Bart.  
American water horehound; F or H, P, N  
RA

*Monarda clinopodioides* Gray  
basil beebalm; F or H, A, N  
MGP

*Monarda punctata* L.  
spotted beebalm; F or H, A, N  
MGP

*Salvia azurea* Michx. ex Lam.

azure blue sage; F or H, P, N  
MGP

*Scutellaria resinosa* Torr.  
sticky skullcap; F or H, P, N  
MGP

*Scutellaria wrightii* Gray  
Wright's skullcap; F or H, P, N  
MGP

*Teucrium canadense* L.  
Canada germander; F or H, P, N  
RA

*Teucrium laciniatum* Torr.  
lacy germander; F or H, P, N  
MGP

### **Linaceae**

*Linum pratense* (J.B.S. Norton) Small  
meadow flax; F or H, A, N  
MGP

*Linum rigidum* Pursh  
stiffstem flax; F or H, A, N  
MGP

### **Loasaceae**

*Mentzelia nuda* (Pursh) Torr. & Gray  
bractless blazingstar; F or H, P, N  
MGP

### **Lythraceae**

*Ammania coccinea* Rottb.  
valley redstem; F or H, A, N  
RA

### **Malvaceae**

*Callirhoe involucrata* (Torr. & Gray) Gray  
purple poppymallow; F or H, P, N  
MGP

*Hibiscus tironum* L.  
flower of an hour; F or H, P, N  
MGP

*Sphaeralcea coccinea* (Nutt.) Rydb.  
scarlet globemallow; F or H, P, N  
MGP

### **Menispermaceae**

*Cocculus carolinus* (L.) DC.  
Carolina coralbead; V, P, N  
SW

### **Molluginaceae**

*Mollugo verticillata* L.  
green carpetweed; F or H, A, N  
MGP

### **Moraceae**

*Morus alba* L.  
white mulberry; T, P, I  
OF

### **Nyctaginaceae**

*Mirabilis albida* (Walt.) Heimerl  
white four o'clock; F or H, P, N  
MGP

*Mirabilis linearis* (Pursh) Heimerl  
narrowleaf four o'clock; F or H, P, N  
MGP

*Mirabilis nyctaginea* (Michx.) MacM.  
heartleaf four o'clock; F or H, P, N  
MGP, SW

### **Oleaceae**

*Forestiera pubescens* Nutt.  
stretchberry; S, P, N  
SW

### **Onagraceae**

*Calylophus berlandieri* Spach  
Berlandier's sundrops; F or H, P, N  
MGP

*Calylophus hartwegii* (Benth.) Raven  
Hartweg's sundrops; F or H, P, N  
MGP

*Calylophus serrulatus* (Nutt.) Raven  
yellow sundrops; F or H, P, N  
MGP

*Gaura brachycarpa* Small  
plains beeblossom; F or H, A, N  
MGP

*Gaura parviflora* Dougl. ex Lehm.  
velvetweed; F or H, A, N

MGP

*Oenothera jamesii* Torr. & Gray  
trumpet evening-primrose; F or H, P, N  
RA

*Oenothera laciniata* Hill  
cutleaf evening-primrose; F or H, P, N  
MGP

*Oenothera rhombipetala* Nutt. ex Torr. & Gray  
fourpoint evening-primrose; F or H, P, N  
MGP

### **Oxalidaceae**

*Oxalis stricta* L.  
common yellow oxalis; F or H, P, N  
SW

### **Papaveraceae**

*Argemone polyanthemus* (Fedde) G.B. Ownbey  
crested pricklypoppy; F or H, A, N  
SW

### **Pedaliaceae**

*Proboscidea louisianica* (P. Mill.) Thellung  
ram's horn; F or H, A, N  
MGP

### **Plantaginaceae**

*Plantago patagonica* Jacq.  
wooly plantain; F or H, A, N  
MGP

*Plantago rhodosperma* Dcne.  
redseed plantain; F or H, A, N  
MGP

### **Polygonaceae**

*Eriogonum annuum* Nutt.  
annual buckwheat; F or H, A, N  
OF

*Eriogonum longifolium* Nutt.  
longleaf buckwheat; F or H, P, N  
MGP

*Polygonum aviculare* L.  
prostrate knotweed; F or H, A, I  
MGP

*Polygonum lapathifolium* L.

curlytop knotweed; F or H, A, N  
RA

*Rumex crispus* L.

curly dock; F or H, P, I  
MGP

### **Portulacaceae**

*Portulaca oleracea* L.

little hogweed; F or H, A, N  
OF

### **Primulaceae**

*Androsace occidentalis* Pursh

western rockjasmine; F or H, A, N  
MGP

### **Ranunculaceae**

*Delphinium carolinianum* Walt. ssp. *virescens* (Nutt.) Brooks

Carolina larkspur; F or H, P, N  
MGP

### **Rosaceae**

*Prunus angustifolia* Mars.

Chickasaw plum; S, P, N  
SW

### **Rubiaceae**

*Cephalanthus occidentalis* L.

common buttonbush; S, P, N  
RA

*Galium pilosum* Ait.

hairy bedstraw; F or H, P, N  
OF

*Hedyotis nigricans* (Lam.) Fosberg

diamondflowers; F or H, P, N  
MGP

### **Salicaceae**

*Populus deltoides* Bartr. ex Marsh.

eastern cottonwood; T, P, N  
RA

*Salix exigua* Nutt.

sandbar willow; T, P, N  
RA

*Salix nigra* Marsh.

black willow; T, P, N  
RA

### **Sapindaceae**

*Sapindus saponaria* L.  
western soapberry; T, P, N  
SW

### **Sapotaceae**

*Sideroxylon lanuginosum* Michx.  
gumbully; T, P, N  
SW

### **Scrophulariaceae**

*Castilleja purpurea* (Nutt.) G. Don var. *citrina* (Pennell) Shinnery  
downy Indian paintbrush; F or H, P, N  
MGP

*Penstemon albidus* Nutt.  
white penstemon; F or H, P, N  
MGP

*Veronica arvensis* L.  
corn speedwell; F or H, A, I  
DA

### **Solanceae**

*Chamaesaracha conioides* (Moric. ex Dunal) Britt.  
gray five eyes; F or H, P, N  
MGP

*Physalis cinerascens* (Dunal) A.S. Hitchc.  
smallflower groundcherry; F or H, P, N  
MGP

*Physalis longifolia* Nutt.  
longleaf groundcherry; F or H, P, N  
MGP

*Quincula lobata* (Torr.) Raf.  
Chinese lantern; F or H, P, N  
DA

*Solanum dimidiatum* Raf.  
western horsenettle; F or H, P, N  
OF

*Solanum elaeagnifolium* Cav.  
silverleaf nightshade; F or H, P, N  
MGP

*Solanum rostratum* Dunal  
buffalobur nightshade; F or H, A, N

MGP, OF

*Solanum triflorum* Nutt.

cutleaf nightshade; F or H, A, N

MGP

### **Tamaricaceae**

*Tamarix ramosissima* Ledeb.

saltcedar; T, P, I

RA

### **Ulmaceae**

*Celtis occidentalis* L.

common hackberry; T, P, N

SW

*Ulmus pumila* L.

Siberian elm; T, P, I

SW

*Ulmus rubra* Muhl.

slippery elm; T, P, N

SW

### **Urticaceae**

*Parietaria pensylvanica* Muhl. ex Willd.

Pennsylvania pellitory; F or H, A, N

OF

### **Verbenaceae**

*Glandularia pumila* (Rydb.) Umber

pink mock vervain; F or H, A, N

MGP, OF

*Phyla lanceolata* (Michx.) Greene

lancheaf frogfruit; F or H, P, N

RA

### **Violaceae**

*Hybanthus verticillatus* (Ortega) Baill.

babyslippers; F or H, P, N

MGP

### **Vitaceae**

*Ampelopsis cordata* Michx.

heartleaf peppervine; V, P, N

RA

*Cissus incisa* auct. non Des Moulins

possum grape; V, P, N

SW

*Vitis acerifolia* Raf.

mapleleaf grape; V, P, N

RA

**Zygophyllaceae**

*Kallstroemia parviflora* J.B.S. Norton

warty caltrop; F or H, A, N

DA

*Tribulus terrestris* L.

puncturevine; F or H, A, I

DA

Figure 1: Land cover types of the Washita Battlefield National Historic site.

