

**Botanical Observations and newly Reported Plant Taxa for
Little Bighorn Battlefield National Monument**

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Little Bighorn Battlefield National Monument (LIBI) is composed of the Custer and Reno-Benteen Battlefields. These two relatively small units have been preserved primarily for their historical and cultural resources. However, an active natural resource program with a focus on vegetation management is also in place.

The author was employed as a seasonal biological science technician within the natural resource program at LIBI. Subsequent field work produced a familiarity with the vegetation and overall habitats within the monument boundaries. Selected observations and recommendations are offered which may enhance future projects related to natural resources and vegetation management.

Higher Quality Habitats

While there are serious infestations of exotic species displacing the native prairie flora, particularly *Bromus tectorum* (cheat grass), there are areas within the monument boundaries which possess a diverse and relatively complete native vegetation. This includes a number of prairie ridges, hillsides and other habitats which are reasonably free of exotics. The upland prairie habitats constitute the largest percentage of natural areas within LIBI. It may be advantageous to attempt to map the higher quality portions of the prairie. This could lead to a more targeted approach to exotic species removal as well as implementation of additional management procedures.

One notable upland area occurs within the Reno-Benteen Battlefield. The identified habitat is a very steep north-facing slope above a wooded draw and perpendicular to the west fenceline. A number of native vascular plant species occur here which may be restricted to this habitat within the monument. Further botanical investigation would be necessary to verify this. The supporting habitat characteristics of the slope appear to be due at least in part to the slope aspect which offers some protection from direct sunlight exposure and harsh summer conditions. Proximity to the river may also be an influence. While this habitat is probably fairly common outside of the monument boundaries, it may still warrant the necessary management activities to preserve it.

These activities should include removal of selected trees and shrubs to partially open up the canopy. Additional valuable activities may also include an introductory prescribed burn, preferably a back-burn down the slope. The back-burn would decrease flame length and fire intensity. This would probably protect mature *Juniperus scopulorum* (rocky mountain juniper) and hardwood species in shaded areas with low fuel loads. Ultimately, however, an ecological decision on numbers of appropriate woody plants present would need to be made. Removal of selected exotic species should also be targeted. The main priority may be an herbicide treatment to the expanding *Bromus inermis* (smooth brome) clones which are present.

Within the monument boundaries there are also a number of established drainages between prairie hillsides. These areas often contain a more mesic to at times hydric native flora. One of the most notable of these, in the author's opinion, occurs north of the Tour Road and parking areas associated with the visitor center. The head of the drainage begins just north of the Tour Road adjacent to the visitor center and exits the monument at the west fenceline below the kiosk. Slightly over half-way down the drainage, a small heavily encrusted alkaline seep occurs near an ephemeral spring. Both contain saturated clay soils and produced a water flow for part of the growing season. All of these areas combined, especially the seep and spring, contain what appears to be a unique wetland flora within the upland portion of the monument. Special attention should be considered for this area and would involve primarily the removal of exotic

species. Exotics were removed during the present field season and future monitoring will be necessary to preserve the integrity of the habitat.

In addition, the north-facing prairie hillside above the drainage should be mentioned. Although exotic species occur here as well, and are being addressed, the overall habitat is of fairly high quality. This combination of starkly different habitats and the proximity to park service personnel and equipment lends itself to some experimental vegetation management. With the relatively modest size of the area, it may be possible to remove a significant majority of all exotic species. This could be accomplished through a variety of methods including herbicide application, mechanical cutting, hand-pulling and prescribed burning. The amount of time necessary to remove the exotics and restore the habitats to a natural state could be a beneficial gauge for attempting this activity with additional areas within the monument.

As to the possible introduction of fire, the park road forms one secure boundary of the triangular-shaped site. A controlled burn with the correct wind direction and other environmental variables could proceed with relative safety. Fire timing could be experimented with, particularly late spring burning to impact the invasive annual grasses such as *Bromus japonicus* (Japanese brome) and *B. tectorum*. Because of the modest size of the area and accessibility, monitoring of the area would be relatively simple. Basic vegetation plots or transect lines could be used to evaluate the process. Photographic points taken prior to and after fire is introduced would also be of value. With the proximity to the visitor center, there is potential for a public education component as well.

Floodplain Forest

Only a limited amount of time was spent within the floodplain forest and riparian habitats adjacent to the river. The forest is dominated by *Populus deltoides* (cottonwood) with *Fraxinus pensylvanica* (green ash), *Prunus virginiana* (chokecherry) and *Shepherdia argentea* (buffaloberry) in the understory.

One interesting habitat at the edge of the forest was briefly visited in early September. The site is an oxbow pond which contains a hydric wetland vegetation, including a dense colony of *Scirpus acutus* (bulrush) at one end. Additional species identified include *Leersia oryzoides* (rice cutgrass) and *Alisma triviale* (water plantain). Also along the margins above the water line is a colony of *Carex* sp. (sedge) and a spreading *Salix exigua* (sandbar willow) clone. This small wetland is being impacted by horses entering it from surrounding private property across the river. They have created a narrow access trail from the upper terrace to the pond environment and are grazing the vegetation to some degree. In late September, hoof prints were clearly evident within the open saturated soil of the wetland.

There are a number of additional adjacent areas which would be of interest botanically and should be investigated. Along with the forest, habitats include a lush riparian zone, willow stands and an early successional sandbar system forming within the inner bend of the river.

Exotic Vascular Plants New to the Monument

Several previously unrecorded exotic species are reported by the author. Three are considered to be highly invasive: *Hesperis matronalis* (Dame's rocket), *Melilotus alba* (white sweet clover) and *Sonchus arvensis* subsp. *uliginosus* (field sow thistle).

Several colonies of *H. matronalis* were observed in open areas of the floodplain. In addition, a localized colony was observed in the upland prairie immediately behind seasonal

housing. The varied habitats occupied by *H. matronalis* would suggest a potentially large area is available which this species could colonize in the future.

A single flowering *M. alba* plant was located on Last Stand Hill. The specific location is the vegetated area directly adjacent to handicapped parking. The flowering individual was found close to the curb with several vegetative, first year plants, nearby. Monitoring this population in the future and removing at least all of the flowering plants should be a priority. This can probably be done with a small amount of effort and time.

The third reported invasive species has a more extensive distribution. Several colonies of *S. arvensis* subsp. *uliginosus* were located and treated within the Custer Battlefield in 2010. Of highest concern is a colony found within the drainage, alkaline seep and ephemeral spring described previously, where a large number of plants are present. Two additional colonies were located in the drainage south of the cemetery. Both colonies are very dense and appear to be progressing toward a monoculture. Future monitoring and management activities will be required to halt the spread and impact of this exotic.

Exotic Vascular Plants Outside the Monument

This could be a long list depending on how far from the monument consideration is given. However, two species are reported which could conceivably have an impact in the near future. The first exotic of concern is *Tribulus terrestris* (puncture vine) which was found at the Conoco gas station property. This unusual species was located growing within a vegetated island near the wooden Indian statue and along the north boundary. The spiny seed heads are easily picked up by vehicle tires and transported to new locations. The second exotic noted by the author is *Coronilla varia* (crown vetch). This is a highly invasive species of dry to mesic, open habitats and can form hard to eradicate monocultures. It was located in a flower bed near the porch and entry gate at the Trading Post Café directly across Highway 212 from the entry road leading to the monument.

Plant Look-Alikes

Some vascular plant species may be confused with others in the field, particularly by individuals with little or even modest plant identification skills. This may result in mistakes, specifically treating native plants in place of, or along with the targeted exotic. Selected observations by the author may offer assistance with future identification questions.

Several native species were at least briefly mistaken for *Hypericum perforatum* (common St. John's wort) by individuals working within the monument during the field season. In some cases, it was simply because the flowers were yellow. Perhaps the most plausible mistaken identity may be that of *Calylophus serrulatus* (plains yellow primrose). From a short distance the yellow flowers are approximately the same size as *H. perforatum* and bloom at the same time.

Secondly, *Lactuca oblongifolia* = *L. tatarica* (blue lettuce) is a native species which could be mistaken for *Cirsium arvense* (Canada thistle). Although the leaves are not overly similar, *L. oblongifolia* does grow in patches like *C. arvense*, is approximately the same height, has seed heads which look similar from a distance and is found in the same habitat niche. On occasion, the author has found both species growing together.

Finally, *Solidago rigida* (rigid goldenrod) basal leaves and vegetative growth could be easily mistaken for *Cynoglossum officinale* (hound's tongue) by the uninitiated even at close

inspection. While *S. rigida* prefers a more open prairie habitat than *C. officinale*, the resemblance could cause misidentification and treatment applications.

Vascular Plant Taxa Additions for the Monument

Newly reported vascular plant taxa for LIBI that do not occur on the present monument plant list are a result of observations made by the author from early June until late September, 2010. Many of the listed taxa are those which the author is well acquainted with from Midwestern prairies. Additional unknown taxa were occasionally collected and keyed out. This activity was undertaken at the curiosity of the author and no systematic effort was made to “complete” the monument plant list. A total of 58 previously unknown taxa are herein reported. Of these, 28 selected plant collections were processed, mounted on appropriate paper and turned over to the museum for incorporation into the monument herbarium.

Some of the taxa reported by the author may have been identified previously, but not yet added to the monument vascular plant list. There are numerous botanical and ecological reports in the monument natural resources files. Vascular plant lists are often included and these may need to be reviewed to produce an updated, comprehensive list. In addition, some entries on the plant list are duplicates due to nomenclatural changes and should be purged.

Plant systematics has been undergoing significant changes in recent years. These taxonomic revisions have resulted in a number of nomenclatural changes to any published flora. For the present vascular plant additions, nomenclature follows The Great Plains Flora (1986). This publication was selected as the authority of choice and is applicable as Little Bighorn Battlefield National Monument (LIBI) occurs at the western edge of the Great Plains floristic region and within the scope of the manual. Alterations to fit another authoritative source are possible and can be correlated through the use of synonyms if desired.

Bio-geographic origin of reported taxa is indicated prior to each binomial as either native (no symbol) or non-native (*). A common name for all taxa occurs in parentheses following the binomial. To remain consistent, these names were also selected from Flora of the Great Plains (1986). In addition, prepared specimens submitted to the museum are designated (+) following the common name.

**Vascular Plant Additions
for
Little Bighorn Battlefield National Monument**

VASCULAR CYRPTOGRAMS (Pteridophytes)

POLYPODIACEAE

Cystopteris fragilis (L.) Bernh. (fragile fern) +
Very steep, north facing slope; infrequent; Reno-Benteen Battlefield.

Division PINOPHYTA (Gymnosperms)

CUPRESSACEAE

Juniperus horizontalis Moench (creeping juniper)
Lower slope, east of Deep Ravine Trail; a single 4x4m spreading plant observed.

**Division MAGNOLIOPHYTA (Flowering Plants)
Class Magnoliopsida (Dicots)**

ACERACEAE

Acer negundo L. (box elder)
River terrace and floodplain forest.

APOCYNACEAE

Apocynum cannabinum L. (prairie dogbane)
Variety of open habitats; prefers early successional, often disturbed areas.

ASCLEPIADACEAE

Asclepias viridiflora Raf. (green milkweed)
Upland prairie; scattered but frequent.

ASTERACEAE

Ambrosia psilostachya DC. (western ragweed) +
Variety of open habitats; common.
Artemisia biennis Willd. (biennial wormwood) +
Early successional sandbar adjacent to river.
Artemisia dracunculus L. (silky wormwood) +
Upland prairie near west boundary corner; localized?
Aster brachyactis Blake (rayless aster) +
Moist alkaline habitats - ephemeral spring, alkaline seep and associated drainage northwest of visitor center; localized but common.
Aster ericoides L. (white aster) +
Somewhat moist prairie habitats.
Aster falcatus Lindl. (aster) +
Upland prairie; common.

Bidens frondosa L. (beggar-ticks) +
 Riparian zone along river.

Euthamia occidentalis Nutt. (euthamia) +
 Riparian zone along river.

Helianthus rigidus (Cass.) Desf. subsp. *subrhomboides* (Rydb.) Heiser (stiff sunflower) +
 Open prairie below crest of Greasy Grass Ridge; common but apparently localized.

Kuhnia eupatorioides L. var. *corymbulosa* T. & G. (false boneset) +
 Upland prairie; frequent.

Liatris punctata Hook. (blazing star) +
 Upland prairie; frequent.

Machaeranthera canescens (Pursh) A. Gray (hoary aster) +
 Scattered on dry, sparsely vegetated hillside; Reno-Benteen Battlefield.

Solidago gigantea Ait. (late goldenrod)
 Moist, open habitats.

Solidago mollis Bartl. (soft goldenrod) +
 Upland prairie; frequent.

Solidago rigida L. (rigid goldenrod)
 Upland prairie; frequent.

**Sonchus arvensis* L. subsp. *uliginosus* (Bieb.) Nyman (field sow thistle) +
 Moist prairie drainages; localized but abundant.

**Xanthium strumarium* L. (cocklebur)
 Variety of open habitats; prefers early successional, disturbed areas.

BRASSICACEAE

**Hesperis matronalis* L. (dame's rocket)
 Scattered patches on floodplain and localized behind seasonal housing.

CAPRIFOLIACEAE

Symphoricarpos albus (L.) Blake (white coralberry) +
 Very steep, north facing slope and upper crest; frequent; Reno-Benteen Battlefield.

CHENOPODIACEAE

Atriplex canescens (Pursh) Nutt. (four-wing saltbush) +
 Open prairie, possible alkaline soil; isolated shrub east of the road leading to the pump-house.

**Bassia hyssopifolia* (Pall.) O. Ktze. (five-hook bassia) +
 Small alkaline zone in upland prairie; few plants observed.

CORNACEAE

Cornus stolonifera Michx. (red osier) +
 Frequent on terrace at base of bluffs; south boundary corner adjacent to river.

EUPHORBIACEAE

Euphorbia robusta (Engelm.) Small. (spurge) +
 Upland prairie; infrequently observed.

Euphorbia serpyllifolia Pers. (thyme-leaved spurge) +
Early successional, often disturbed habitats.

FABACEAE

**Melilotus alba* Medic. (white sweet clover)
A single flowering plant; curbside at Last Stand Hill.

LAMIACEAE

Lycopus americanus Muhl. ex Bart. (American bugleweed)
Riparian zone along river.

Lycopus asper Greene (rough bugleweed)
Riparian zone along river.

LOASACEAE

Mentzelia decapetala (Pursh) Urban & Gilg. (ten-petal mentzelia) +
Several localized colonies on dry, sparsely vegetated steep hillsides; Reno-Benteen Battlefield.

NYCTAGINACEAE

Mirabilis linearis (Pursh) Heimerl. (narrowleaf four-o'clock)
Open, sparsely vegetated hillside above Little Bighorn River; a single plant observed.

ONAGRACEAE

Calylophus serrulatus (Nutt.) Raven (plains yellow primrose)
Upland prairie; frequent.

Epilobium paniculatum Nutt. ex T. & G. (willow-herb) +
Open prairie habitats.

Gaura parviflora Dougl. (velvety gaura)
Most commonly observed along prairie drainages.

PLANTAGINACEAE

Plantago elongata Pursh (slender plantain) +
Sparsely vegetated upland alkaline habitat.

ROSACEAE

Crataegus sp. (hawthorn)
Woodland edge on floodplain.
Prunus americana Marsh. (wild plum)
Scattered clones; infrequent?

SCROPHULARIACEAE

Besseyia wyomingensis (A. Nels.) Rydb. (kitten tails)
Very steep, north facing slope; frequent; Reno-Benteen Battlefield.

SOLANACEAE

Physalis heterophylla Nees (clammy ground cherry)

Open prairie; prefers early successional, often disturbed habitats.

Physalis longifolia Nutt. (common ground cherry)

Early successional, disturbed habitats.

URTICACEAE

Parietaria pensylvanica Muhl. (Pennsylvania pellitory) +

Prefers slightly moist, disturbed habitats with partial shade; also observed around buildings.

VERBENACEAE

Verbena bracteata Lag. & Rodr. (prostrate vervain)

Prefers early successional, disturbed habitats; very common along the road leading to the pump-house.

Verbena hastata L. (blue vervain)

Immediate riparian zone along river.

Verbena stricta Vent. (hoary vervain)

Observed on open floodplain terrace; may also be present in some upland prairie habitats.

VITACEAE

Vitis riparia Michx. (river-bank grape)

Floodplain habitats.

Class Liliopsida (Monocots)

ALISMATACEAE

Alisma triviale Pursh (water plantain)

Oxbow pond on floodplain.

CYPERACEAE

Eleocharis sp. (spikerush)

Ephemeral spring northwest of visitor center.

Scirpus maritimus L. var. *paludosus* (A. Nels.) Kukenth. (bulrush) +

Drainage in upland prairie; localized.

JUNCACEAE

Juncus sp. (rush)

One caespitose clump in alkaline seep northwest of visitor center.

POACEAE

Andropogon gerardii Vitman (big bluestem)

Mesic upland prairie; frequent.

Andropogon scoparius Michx. (little bluestem)

Upland prairie; infrequent.

Leersia oryzoides (L.) Sw. (rice cutgrass)

Oxbow pond on floodplain.

Oryzopsis hymenoides (R. & S.) Ricker (Indian ricegrass) +
Dry, open hillsides; frequent.

Puccinellia distans (L.) Parl. (alkali-grass) +
Alkaline seep northwest of visitor center.

Spartina pectinata Link (prairie cordgrass)

Common within riparian zone along river; scattered within open floodplain habitats.