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Introduction

In 1998, the National Park Service (NPS) contracted with The Nature Conservancy (TNC) for an inventory of the vascular plant of Wind Cave NP, located in the Black Hills in western SD. Although the Black Hills have been settled for over a hundred years, many areas remain relatively poorly known botanically. New discoveries continue to be made each year. Without better basic floristic information, it is impossible to address plant-related management issues, such as rare plant protection.

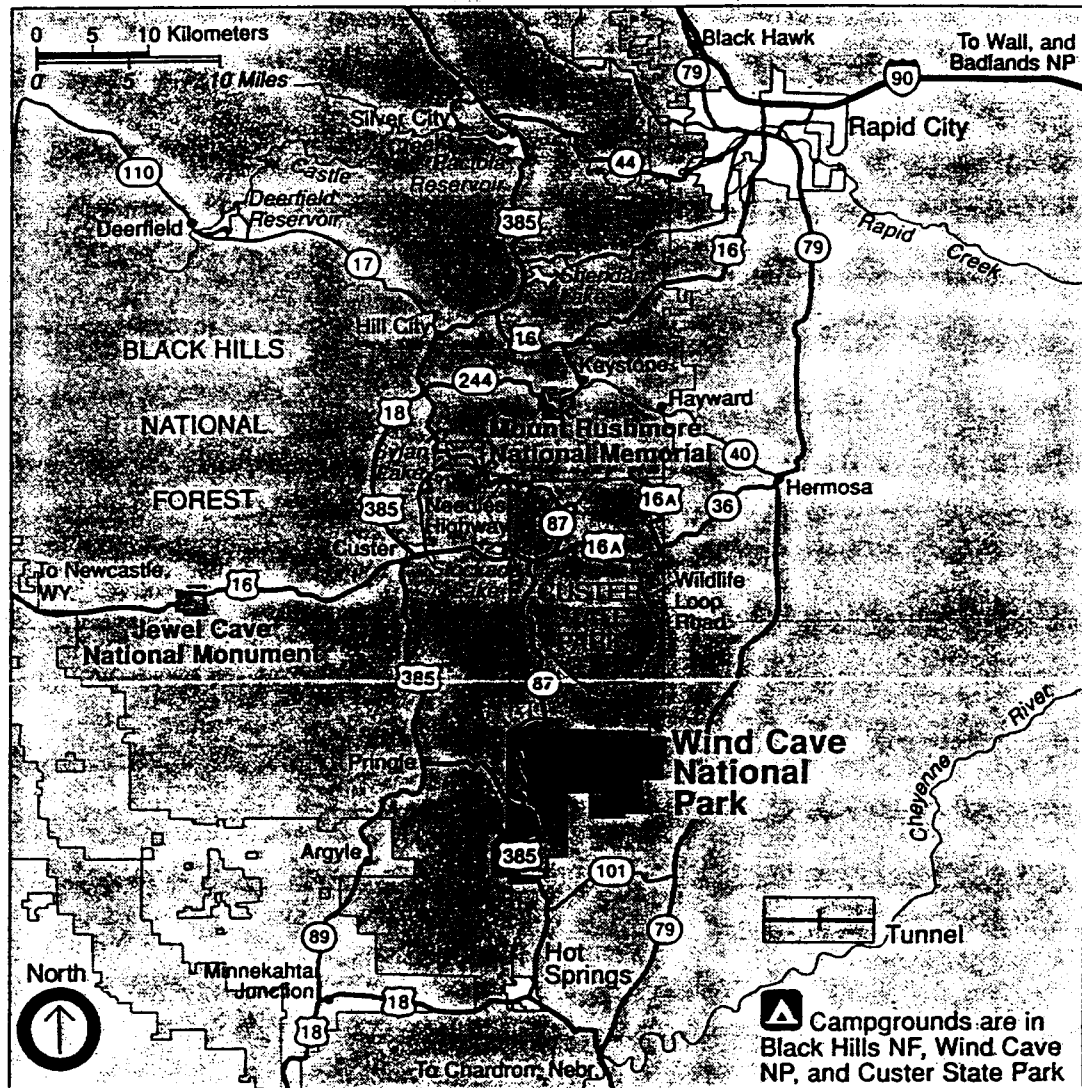
Prior to this project, it was strongly suspected that there still were large gaps in the knowledge of the flora of Wind Cave National Park. Just over 400 species of vascular plants had been documented as occurring in the park (i.e. based on herbarium specimens). In comparison, over 450 plant taxa are known from Devils Tower National Monument in the northwest Black Hills, which is a much smaller park (1200 acres vs. 28,000 acres).

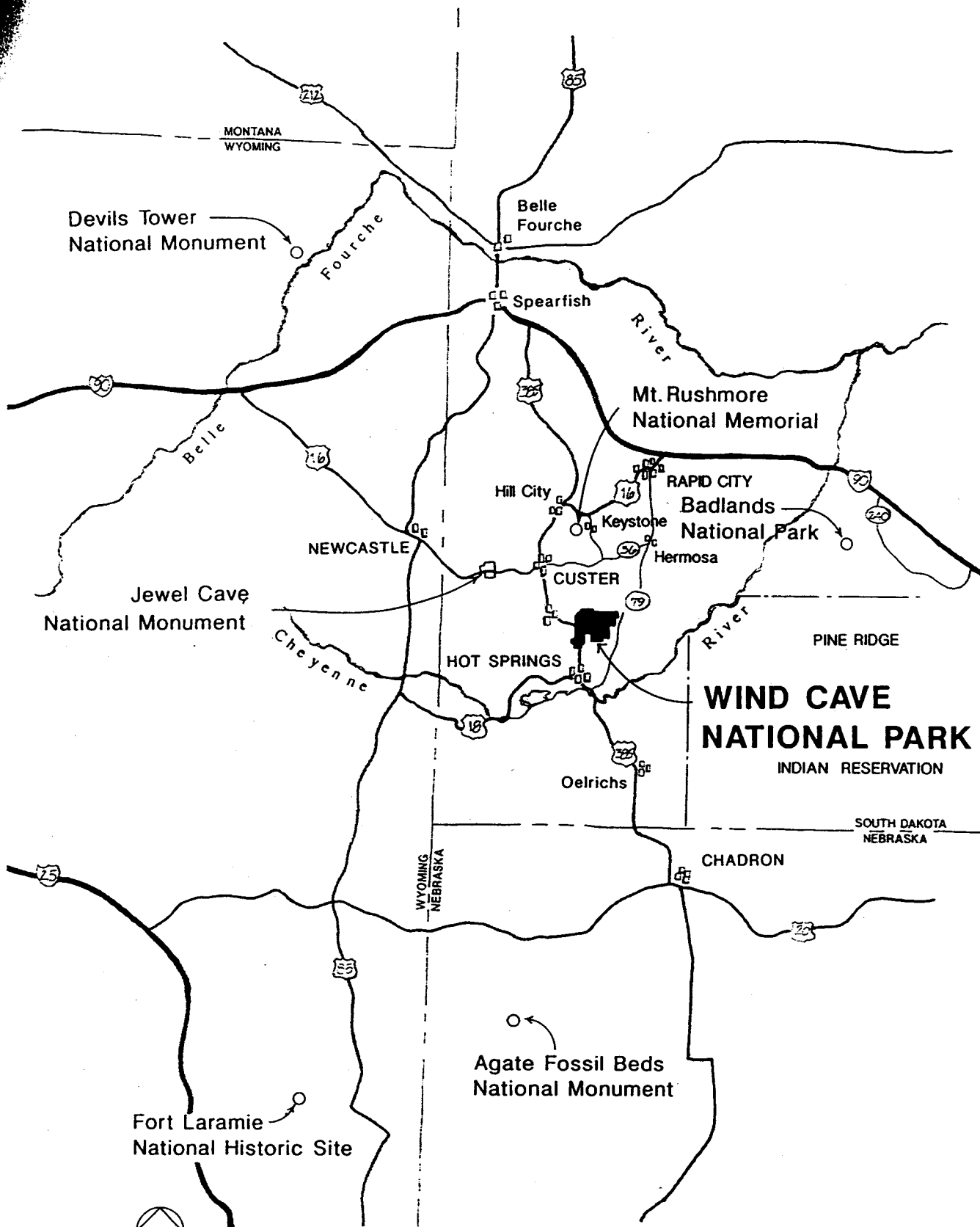
Study Area

Wind Cave National Park is located in southwest South Dakota, in the southeast part of the Black Hills, approximately 35 air miles south-southwest of Rapid City (Fig. 1). The park is roughly eight miles across at its widest point, and eight miles in length, encompassing 28,292 acres (Fig. 2). Elevations range from 3600 ft. in the southeast corner to 5000 ft. in the westernmost part of the park. The high point of 5013 ft. is located at the north end of Rankin Ridge.

The park includes all of the major geomorphic subdivisions of the Black Hills (Froiland 1990; Fig. 3). The Central Core, made up of granitic and metamorphic rocks, is represented in the highest, westernmost part of the park. East of this zone is an area underlain by limestones and sandstones, corresponding to the Limestone Plateau and Minnelusa Foothills regions of the Black Hills. At Wind Cave NP, the Limestone Plateau is not well-developed due to the steep dips of the rock strata (Pahasapa limestone). The Minnelusa Foothills zone is more extensive, and includes narrow limestone-rimmed drainages such as Limestone and Curley Canyons. Elevations drop through the Minnelusa Foothills to the Red Valley in the eastern part of the park. The underlying red Spearfish formation is exposed intermittently as red badlands, frequently with gypsum outcrops. The outermost geomorphic subdivision is the Hogback Rim, well-represented at Wind Cave NP by Boland Ridge along the east boundary. Here, steeply-tilted sandstones underlie a ridge standing up to 400 ft. above the Red Valley. In the northern and central parts of the park are broad flat benches capped with old alluvial deposits. Good examples of these broad benches are located in the northeast part of the park between NPS Roads 5 and 6.

Figure 1. Location of Wind Cave National Park (National Park Service).



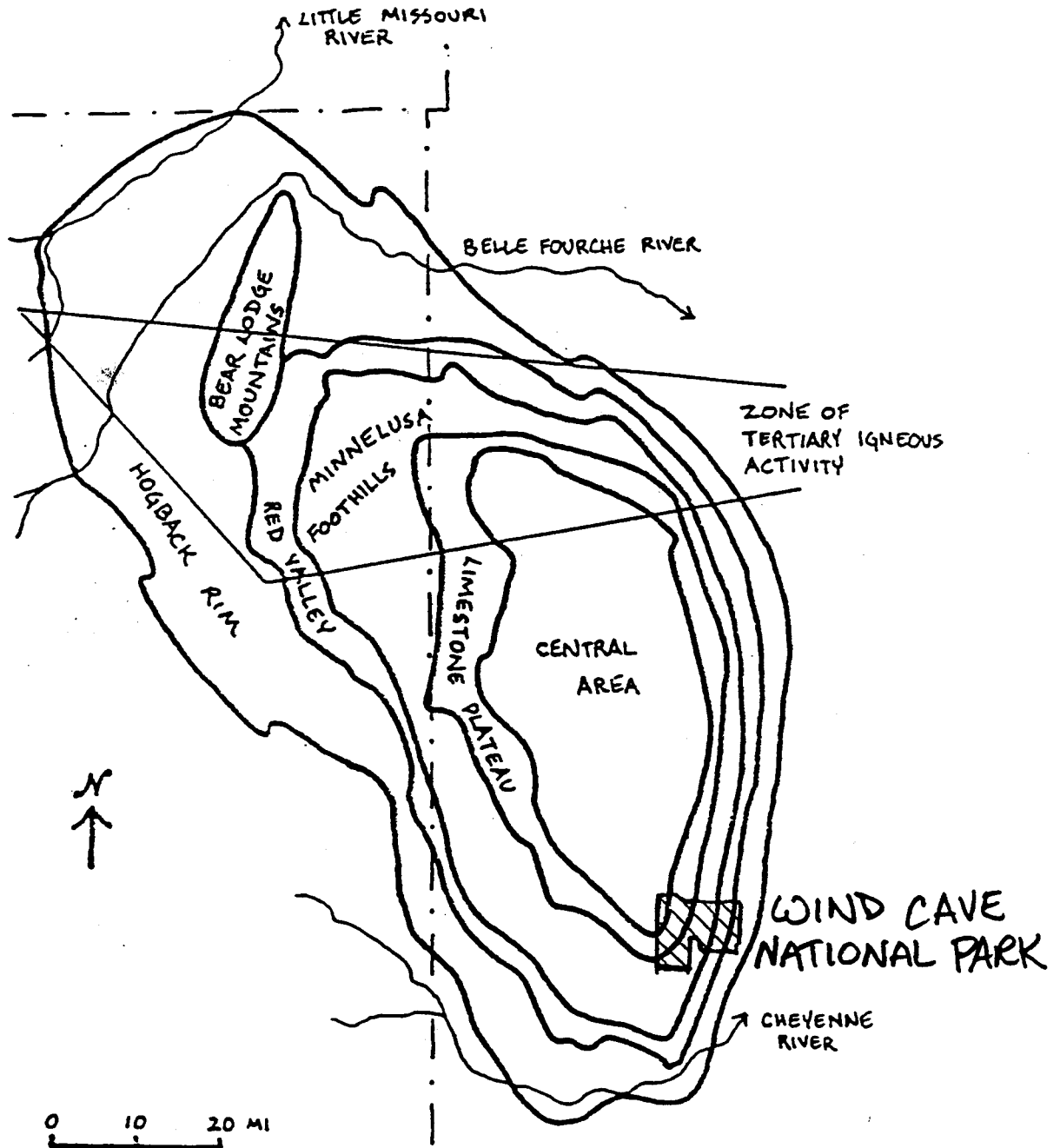


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WIND CAVE NATIONAL PARK

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Figure 3. Geomorphic subdivisions of the Black Hills, with Wind Cave NP indicated (Marriott 1985).



Major drainages in the park generally trend east and southeast. The more important are Beaver, Cold Spring and Highland Creeks, sections of which flow all or most of the year. Many of the smaller drainages are dry. Flowing springs are occasional, found at scattered locations. Other standing water is rare. In most years, a "lake" forms on Bison Flats in the south part of the park, drying out through the summer. A few other very small ponds with limited aquatic vegetation are found at scattered locations.

Major vegetation types at Wind Cave NP include ponderosa pine forests and woodlands, hardwood draws dominated by boxelder, green ash and elm with occasional stands of other hardwoods, mountain mahogany shrublands, several shrubby draw types, riparian stands, mixedgrass prairies and prairie dog towns. Twenty-eight plant community types have been recognized and mapped in the park (NPS/USGS in prep.). The higher western part of the park generally has more tree cover. Much of the eastern part of the park is prairie, with stands of pine woodland on Boland Ridge along the eastern boundary. Mountain mahogany shrubland is well developed in the Minnelusa Foothills zone west of the Red Valley.

Wind Cave NP is best known for its extensive cave system, with over 83 miles of passageways. Most of the visitors to the park each year come to see the cave. Wildlife viewing is another important attraction. Several prairie dog towns are located along the approximately 11 miles of paved road in the west part of the park, and bison are frequently seen as well. Two gravel roads and several trails cross the central and eastern parts of the park, but use is light.

Methods

The goals of this project were: 1) document the vascular plant flora of Wind Cave NP; 2) identify plant species of special concern; 3) document populations of species of concern found during survey. Both secondary sources and field survey were used to collect needed information.

Secondary Source Information

Prior to this project the park had a small herbarium collection, and several plant lists had been compiled (e.g. Brutvan and Klukas 1982, Kopper 1994). These lists contained species that had been collected in the park, as well as species that were considered likely to occur in the park based on local and regional floras.

In the spring of 1997, all specimens from Wind Cave NP herbarium were sent to the Rocky Mountain Herbarium at the University of Wyoming for review and verification. Some errors were found, but most identifications were correct. Based on herbarium specimens and records from the SD Natural Heritage Program (SDNHP) database, 407 species were documented for the park (Marriott 1997). Fifteen specimens and records were questionable due to either insufficient collection location information (may have been outside the park), or inadequate material for identification.

A request was sent to the SDNHP for element occurrence information for plant species of special concern known from the Wind Cave NP area. The database was searched for records from the major drainage containing the park, an area extending from Hill City in the northwest to Minnekahta and Hot Springs in the southwest, to the vicinity of the confluence of Spring Creek and the Cheyenne River on the east side (Fig. 4). The prairies to the east were included in the database search as Wind Cave NP includes prairie habitat. A list of 56 species was produced (SDNHP 1998). Most occurred in the northwest part of the major drainage in the high Black Hills. Seven were located in Wind Cave NP, and eight others were thought to possibly be found in the park based on habitat (Table 1).

Field Survey

Field work focused primarily on floristic survey of Wind Cave NP to document vascular plant species found in the park, with emphasis on rare species. All habitat types within the Park were surveyed during visits distributed through the growing season (early, mid and late). The field season began in mid-May and ended in mid-September. All survey was done by H. Marriott and C. Reed. At survey sites, routes were chosen only approximately beforehand. Actual paths taken were based on habitat and vegetation types found. All types were surveyed, but greater attention was given to habitat types where Black Hills rare plants typically occur, such as mesic drainages and rock or barren soil outcrops. Survey routes and sites are shown in Appendix 1.

During the 1998 field season, both investigators also were involved in the second year of a vegetation mapping project at the park (NPS/USGS in prep.). Some species relevant to the floristic inventory were found during this work as well.

Collections were made as appropriate. Entire plants were collected only when at least 25 individuals of a species occurred in the area. In other cases, fragments with identifiable material were collected. No species were found to be so rare that no material could be collected. Species not already represented in the park's herbarium were documented with collections and collection data.

Additional data were gathered for species of special concern (SDNHP 1998) using Rare Plant Survey Forms (Appendix 2). Population size was estimated, and habitat described in detail. Occurrences were documented with photographs, and mapped on 7.5' topographic maps. Collections were made where appropriate.

Information Management

Determinations of all collected material were verified at the Rocky Mountain Herbarium at the University of WY by Marriott with assistance from Dr. Ronald Hartman, Curator, and B. E. Nelson, Herbarium Manager. Herbarium labels were included with specimens in newspaper provided for the park herbarium. A copy of this report has been sent to the SDNHP, where rare plant occurrences will be mapped and entered into the database of species of special concern.

Figure 4. Major drainage containing Wind Cave NP -- used as basis for searching SDNHP database for plant species of special concern.

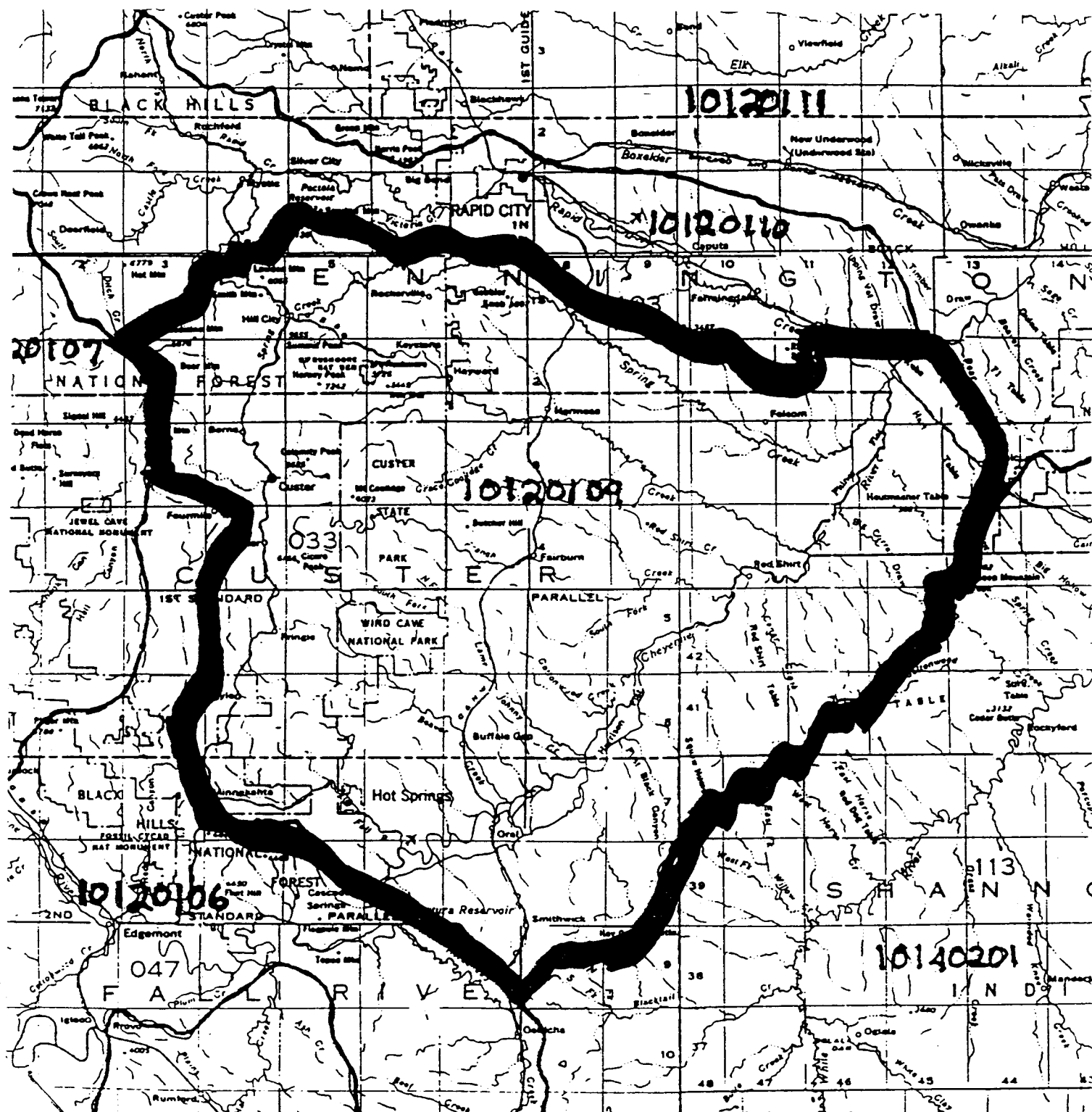


Table 1. Plant species of special concern known from the Wind Cave NP area (SDNHP 1998). Heritage ranks are explained in Appendix 5.

<i>Astragalus americanus</i>	American Milk-Vetch	G5S3
<i>Astragalus barrii</i>	Barr Milk-Vetch	G3S3
+ <i>Echinocereus viridiflorus</i>	nylon hedgehog cactus	G5SU
+? <i>Elymus diversiglumis</i>	interrupted wildrye	G3?SU (no voucher)
+ <i>Ipomopsis spicata</i>	spiked gilia	G4?S4?
<i>Lechea intermedia</i>	Narrowleaf Pinweed	G5SU
<i>Lesquerella arenosa</i> var <i>argillosa</i>	Secund Bladderpod	G5T2SU
<i>Lesquerella montana</i>	Mountain Bladderpod	G5SU
<i>Lomatium nuttallii</i>	Nuttall Desert-Parsley	G3SH
<i>Oenothera flava</i>	Long-Tubed Evening-Primrose	G5SU
<i>Senecio spartioides</i>	Broom Groundsel	G5SU
+ <i>Stipa robusta</i>	sleepy grass	G5SU
+ <i>Thelesperma megapotamicum</i>	Hopi tea greenthread	G5SU
+ <i>Townsendia exscapa</i>	easter daisy, stemless townsendia	G5S4?
+ <i>Townsendia hookeri</i> Hooker's	townsend-daisy	G5SU

+ reported from within the park

* voucher specimen needs to be verified

Results

Flora

Prior to this project, 407 vascular plant taxa had been documented as occurring in Wind Cave National Park, based on collections in the park herbarium and records in the SDNHP's database. During the 1998 field season, 88 new records for the park were added, expanding the documented flora by 22%. The flora of Wind Cave NP is now known to include 495 taxa of vascular plants. An additional 15 species have been reported for the park, but documentation either does not exist, is inadequate (e.g. immature material) or the specimen, located elsewhere, needs to be verified. A list of plant species currently known from Wind Cave NP is included in Appendix 3.

Of the plants found in the park, 56 are exotic (and two are possibly exotic), representing 11% of the flora (Table 2). Of these, five are considered noxious by the State of South Dakota or Custer County. Most of the non-natives occur in the park as occasional individuals or small populations. Many are restricted to disturbed habitats.

Plant Species of Concern

No plant species Federally-listed as Threatened or Endangered, nor any candidates for listing, were found at Wind Cave NP. Three or four plant species of special concern in SD were documented. Multiple populations of hedgehog cactus and hopi-tea were found. Several townsendia populations were found, but all were past flowering, and not identifiable to species. These are either easter daisies or Hooker's townsend-daisies, both of which are tracked by the SDNHP. Detailed information about each species of special concern is presented in the next sections. Element occurrence records and maps are included in Appendix 4.

Table 2. Exotic and designated-noxious plant species known for Wind Cave NP. Designated noxious species are indicated with "SD" (state designated) or "Custer Co." (county designated) in the third column. Sources are Barkley *et al.* 1986; Custer Co. Weed and Pest Board 1998.

NOTE: Questionable records are marked "*" with comments in the third column.

Agropyron cristatum (L.) Gaertn.	crested wheatgrass	
Alyssum alyssoides (L.) L.	pale madwort	
Alyssum desertorum Stapf	desert madwort	
Anagallis arvensis L.	scarlet pimpernel	
Arctium minus Bernh.	lesser burdock	
Asparagus officinalis L.	garden asparagus	
Bromus commutatus Schrad.	meadow brome	
Bromus inermis Leyss.	smooth brome	
Bromus tectorum L.	cheatgrass	
Camelina microcarpa DC.	littlepod falseflax	
Capsella bursa-pastoris (L.) Medik.	shepherd's purse	
Carduus nutans L.	musk thistle	
Centaurea maculosa auct. non Lam.	spotted knapweed	Custer Co.
Cerastium vulgatum L. 1762, non 1755	big chickweed	
*Chenopodium album L.	lambsquarters	id questionable (imm.)
Chorispora tenella (Pallas) DC.	crossflower	
Cirsium arvense (L.) Scop.	Canadian thistle	SD
Cirsium vulgare (Savi) Ten.	bull thistle	
Convolvulus arvensis L.	field bindweed	SD
Cynoglossum officinale L.	houndstongue	
Dianthus armeria L.	Deptford pink	
Echinochloa crus-galli (L.) Beauv.	barnyardgrass	
Engelmannia pinnatifida Gray ex Nutt.	Engelmann's daisy	exotic?
Eragrostis cilianensis (All.) Lut. ex Janchen	stinkgrass	
Euphorbia esula L.	leafy spurge	SD
Euphorbia glyptosperma Engelm.	a spurge	
Euphorbia marginata Pursh	snow on the mountain	
Euphorbia robusta (Engelm.) Small	Rocky Mountain spurge	
Euphorbia serpyllifolia Pers.	a spurge	
Euphorbia spathulata Lam.	warty spurge	
Euphorbia stictospora Engelm.	a spurge	
Galeopsis bifida Boenn.	splitlip hempnettle	
Geranium pusillum L.	small geranium	
Hesperis matronalis L.	dames rocket	
Lactuca serriola L.	prickly lettuce	
Leonurus cardiaca L.	common motherwort	
*Linaria vulgaris P. Mill.	butter and eggs	collected in WICA?
Marrubium vulgare L.	horehound	
Medicago lupulina L.	black medick	
Melilotus alba Medikus	white sweetclover	
Melilotus officinalis (L.) Lam.	yellow sweetclover	
Nepeta cataria L.	catnip	

Poa pratensis L.
Phleum pratense L.
Phryma leptostachya L.
Plantago major L.
Poa compressa L.
Portulaca oleracea L.
Ranunculus testiculatus Crantz
Rhamnus cathartica L.
Rumex crispus L.
Salsola iberica Sennen & Pau
Salvia azurea Michx. ex Lam.
Saponaria officinalis L.
Silene pratensis (Rafn) Godr. & Gren.
Sisymbrium altissimum L.
Sonchus asper (L.) Hill
Thlaspi arvense L.
Tragopogon dubius Scop.
Tragopogon pratensis L.
Verbascum thapsus L.

Kentucky bluegrass	exotic?
timothy	
American lopseed	
common plantain	
Canada bluegrass	
little hogweed	
hornseed buttercup	
common buckthorn	
curly dock	
prickly Russian thistle	
azure blue sage?	
bouncingbet	
a silene	
tall tumbledustard	
spiny sowthistle	SD
field pennycress	
yellow salsify	
meadow salsify	
common mullein	

Echinocereus viridiflorus
HEDGEHOG CACTUS or NYLON HEDGEHOG CACTUS
Cactaceae (Cactus Family)

Status The hedgehog cactus is ranked G5SU by the SDNHP (1998), i.e. it is globally common, but its status in SD is unknown (natural heritage ranks are explained in Appendix 5). It appears to be rare in the state, based on the limited documentation currently available.

Technical description Stem 1 to 5 cm tall, rarely to 12 cm tall, less than 4 cm diam, cylindroid-ovoid, domed, prominently ribbed, the ribs with more or less obvious spiniferous tubercles. Areoles distinctly elliptic; central spine 0-1, ca 1 cm long, longer and thicker than the radial spines; radial spines 8-16 or more, pectinately disposed on the areole, ca 5 mm long, appressed to the ribs or sometimes recurved into the grooves, the upper mostly shorter than the lower in the same areole, whitish to purplish and often the upper and lower similarly colored but different from the middle spines, the entire plant then color-patterned. Flower ca 2.5 cm long, green or greenish, the petaloids entire, acute to rounded. Fruit spiny, globose to ovoid, green, ca 1 cm long; seeds black, densely tuberculate (Barkley *et al.* 1986).

Non-technical description and field characters The hedgehog cactus is a low rounded succulent plant, usually less than 5 cm tall and 4 cm in diameter. It has prominent ribs, with spiny tubercles somewhat developed but not strongly so. Flowers are relatively large, ca. 2.5 cm long, and greenish. The fruit is greenish, spiny, more or less round, and approximately 1 cm long. The hedgehog cactus and its habitat are shown in Figs. 5 and 6.

Two species of pincushion cactus (*Coryphantha missouriensis* and *C. vivipara*) also occur in the Wind Cave NP area. The pincushions have a similar growth-form to that of the hedgehog cactus. However, they do not have ribs, and their spiny tubercles are quite prominent. The flowers of *C. missouriensis* are greenish to yellowish. *C. vivipara* has pink flowers. The fruit of both species are red (vs. green in the hedgehog cactus).

Global distribution The hedgehog cactus occurs on the Great Plains from southwest SD and southeast WY south through western NE and KS, eastern CO, and the OK and TX panhandles (Barkley *et al.* 1986). In SD, it is restricted to the southwest part of the state (Van Bruggen 1985), where it is at the northern edge of its overall range.

Distribution at Wind Cave NP The hedgehog cactus was found at 13 locations scattered throughout the park (see element occurrence maps in Appendix 4).

Habitat Rangewide, the hedgehog cactus generally occurs on rocky, gravelly and sandy prairies (Barkley *et al.* 1986). Van Bruggen (1985) reports it from dry sandy soil in southwest SD.

At Wind Cave NP, the hedgehog cactus typically occurs in less vegetated areas in grasslands. Often soils at these microsites are more rocky, sandy or gravelly than adjacent more vegetated areas. Populations were found in areas underlain by a variety of rock types, including igneous and metamorphic rocks, sandstone, limestone and coarse alluvium. The largest populations were found on broad flat benches capped with cobbly alluvium. In these situations, the hedgehog cactus often is found near the edges of the benches where soils are rockier, and there is less vegetation cover.

The hedgehog cactus occurs on slopes ranging from nearly flat to moderate (ca. 10%). It was found on all aspects, and at elevations ranging from 3700 to 4450 ft.

The most common associated plant species found with the hedgehog cactus were graminoids and prairie forbs and shrubs, including little bluestem, Kentucky bluegrass, needle-and-thread, blue grama, side-oats grama, thread-leaf sedge, western wheatgrass, big bluestem, fringed sagebrush and plains pricklypear.

Hedgehog cactus habitat at Wind Cave NP is shown in Fig. 6.

Abundance The hedgehog cactus is not rare in Wind Cave NP. Thirteen occurrences were documented during the course of this project. An occurrence is defined as one or more clusters of plants, separated by less than a mile. Occurrences ranged in size from less than 0.1 to more than 10 acres, and contained from 2 to 250 individuals. As the season progressed, and it became apparent that the hedgehog cactus was common in the park, surveys were done more quickly. Thus a smaller percentage of the plants occurring in an area were counted. In several cases, populations may have included as many as 500 individuals, based on the number of plants found within a small subset of potential habitat.

Hedgehog cacti were frequently found in the areas surveyed, and it is highly likely that there are many additional occurrences in the park. A surveyor must look carefully for the hedgehog cactus, for it is low and inconspicuous, and easily overlooked.

Other comments Survey results at Wind Cave NP suggest that the hedgehog cactus may be significantly more common in southwest SD than it currently appears to be based on collections and reports. This cactus is low and inconspicuous, and is easily overlooked. If the hedgehog cactus is shown to be as abundant throughout its range in southwest SD as it is at Wind Cave NP, the species may no longer need to be considered of special concern for the state. However the population is at or near the northern extent of the overall range of the species. It is therefore quite possible that the hedgehog cactus will remain on the list of species of concern for SD.

The hedgehog cactus is not of management concern at Wind Cave NP at this time due to its abundance. The park's policy prohibiting collection should be sufficient to protect the species within park.

Figure 5. Drawing of *Echinocereus viridiflorus*, the hedgehog cactus (Benson 1982).

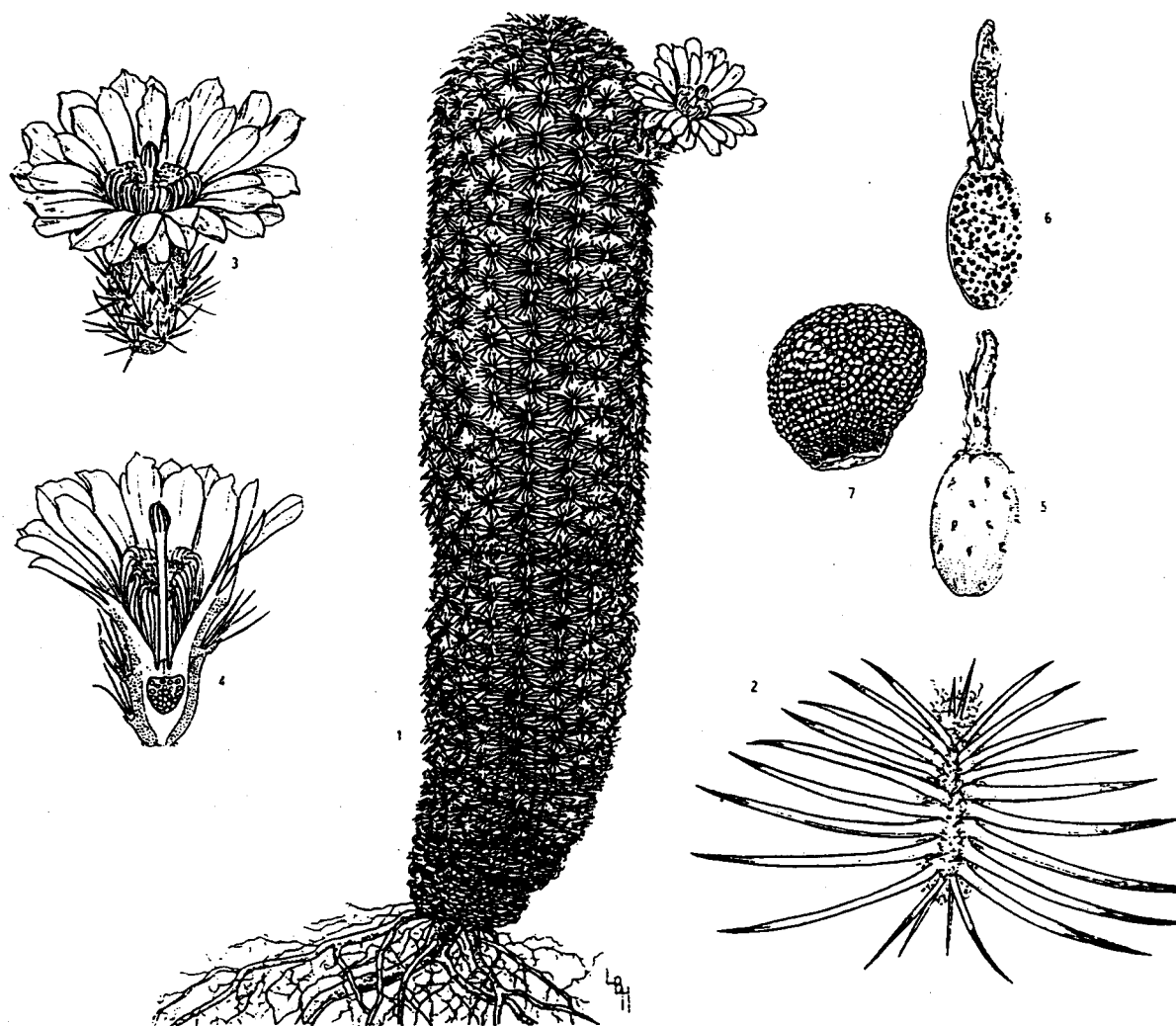


Fig. 710. *Echinocereus viridiflorus* var. *viridiflorus*, $\times 1.75$, except as indicated. 1. Plant from cultivation, grown proportionately much taller than those common in nature, $\times 1.2$. 2. The elongate or elliptic areole with pectinately arranged radial spines (often like the teeth of a comb), in this case with no central spine(s), $\times 6$. 3. Flower. 4. Flower in longitudinal section. 5. Fruit after fall of the spines. 6. Fruit in longitudinal section. 7. Seed, $\times 16$.

Figure 6. Photographs of *Echinocereus viridiflorus* and habitat at Wind Cave NP; Boland Ridge; photos by C. Reed, 7 JL 98.



Thelesperma megapotamicum
HOPI-TEA or HOPI TEA GREENTHREAD
Asteraceae (Aster Family)

Status The hopi-tea is ranked G5SU by the SDNHP (1998), i.e. it is globally common, but its status in SD is unknown (natural heritage ranks are explained in Appendix 5). It appears to be rare in the state, based on the limited documentation currently available.

Technical description Perennial herb 3-7.5 dm tall. Stems arising singly or clustered from creeping rootstocks. Leaves either evenly distributed along the stem, with rather long internodes, or crowded toward the lower 1/2; basal and lower cauline leaves once or infrequently twice pinnatisect, sometimes merely trifid or simple, 4-9 cm long overall, ultimate segments linear-lanceolate to linear. Involucre campanulate to subhemispheric, 7-14 mm across; outer involucre bracts 4-6, oblong to ovate, 1-2+ mm long, usually appressed; inner involucre bracts 8, ovate-lanceolate, basally connate for barely 2/3 their length; ray florets rarely present; disk florets with corolla yellow, with reddish-brown veins, deeply and irregularly lobed; chaffy bracts 7-11 mm long, often erose. Achenes 4-8 mm long, erect or somewhat incurved, subterete to weakly flattened; pappus of 2 triangular, retrorsely barbed awns, 1.5-3 mm long (Barkely *et al.* 1986).

Non-technical description and field characters Hopi-tea is a perennial herb 3-7.5 dm tall. Leaves are opposite, and either widely scattered along the stem or crowded on the lower half. Leaves are very narrow, often linear or divided into linear segments. The inflorescence is open, with flowering heads on long stems. Flowering heads are smallish, 7-14 mm across, and the involucre enclosing the flowers is made up of oblong to ovate bracts. These bracts are in two series, the outer less than 1/4 as long as the inner. Ray flowers (strap-shaped outer flowers) usually are absent. Disc flowers (tubular inner flowers) are yellow, often with reddish veins. Hopi-tea and its habitat are shown in Figs. 7 and 8.

Thelesperma filifolium (a greenthread) also occurs in the area of Wind Cave NP. This species has yellow ray flowers, although they can be somewhat inconspicuous (rays are usually absent in *T. megapotamicum*). In addition, the outer of the two series of involucre bracts is larger, with the outer bracts up to 1/2 as long as the inner ones (vs. 1/4 in *T. megapotamicum*).

Global distribution Hopi-tea is a wide-spread species, occurring throughout the south half of the Great Plains in North America, west into UT and AZ, and south through Mexico and Central America into South America (Barkley *et al.* 1986). It is rare in SD, where it is at the northern edge of its overall range, and is known only from the southwest part of the state (Van Bruggen 1985).

Distribution at Wind Cave NP Hopi-tea was found in the west-central part of the

park, in the vicinity of Wind Cave Canyon, Cold Spring Creek near the west park entrance, and Beaver Creek near the east park boundary (see element occurrence maps in Appendix 4).

Habitat Rangewide, hopi-tea generally is found on open sites where there is less vegetation (Barkley *et al.* 1986). Van Bruggen (1985) states that it occurs on dry sandy soils in southwest SD.

At Wind Cave NP, hopi-tea was found in grasslands and open pine woodland on rocky, gravelly and sandy soils, usually on steep slopes with southerly or westerly aspects. Elevation ranged from 4000 to 4300 ft. Common associates include prairie species such as needle-and-thread, little bluestem, Kentucky bluegrass, western wheatgrass, fringed sagebrush and plains pricklypear.

Hopi-tea habitat at Wind Cave NP is shown in Fig. 8.

Abundance Four occurrences of hopi-tea were documented during the course of this project. An occurrence is defined as one or more clusters of plants, separated by less than a quarter mile. Occurrences ranged in size from four to over 1000 flowering stems, in areas ranging from less than 0.1 to 1.1 acres.

Other comments Although common globally, the hopi-tea is at the edge of its overall range in SD, where it appears to be rare. Only four occurrences were documented in Wind Cave NP, not enough to recommend removing the species from the list of plants tracked by the SDNHP. At this time, it should be considered a species of special concern at the park. Existing populations should be left undisturbed. Because it prefers open habitat with less competition, hopi-tea populations will appear and disappear with disturbance and subsequent revegetation, from both natural and human-caused events. The species is not sufficiently rare regionally nor globally to warrant active habitat management.

Figure 7. Drawing of *Thelesperma megapotamicum*, hopi-tea (Britton and Brown 1913).



Figure 8. Photograph of *Thelesperma megapotamicum* at Wind Cave NP; Hwy 385 just south of Wind Cave Canyon; photo by C. Reed, 28 JL 98.



Townsendia exscapa
EASTER DAISY or STEMLESS TOWNSENDIA
Asteraceae (Aster Family)

Status The easter daisy is ranked G5S4? by the SDNHP (1998), i.e. it is globally common, but its status in SD is at question (natural heritage ranks are explained in Appendix 5). It is known from relatively few locations in the state, but these are fairly widespread. The widespread distribution, and the difficulties in surveying easter daisies (they are small and bloom very early) suggest that the species is more common than currently documented. There are identification problems also, i.e. it can be difficult to distinguish *T. exscapa* from *T. hookeri*, Hooker's townsend-daisy.

Technical description Dwarf acaulescent subcespitose perennial, arising from a coarse, branching caudex surmounting a taproot. Leaves all basal, lanceolate or linear-lanceolate and without a terminal tuft of ciliate hairs; ray florets 20-40, ligule white or pinkish, 12-22 mm long and 1-3 mm wide; disk florets with corolla yellow, sometimes pink or purple-tinged at the apex, (6)9-10(12) mm long. Achenes flattened and 2-ribbed, or ray achenes sometimes 3-ribbed, 3.5-6 mm long, pubescent; pappus of disk and ray florets similar, of slender barbellate bristles, disk pappus exceeding the corolla (Barkley *et al.* 1986).

Non-technical description and field characters The easter daisy is a small, low perennial herb, rarely greater than 5 cm in height. Leaves are linear and clustered at the base of the plant. The one-to-few flowering heads also are attached near the base of the plant, surrounded by the leaves. The strap-shaped outer ray flowers are white to pinkish. The inner, tubular disk flowers are yellow, sometimes with pink or purple tinges at the top. The easter daisy is shown in Fig. 9.

It is difficult to distinguish *Townsendia exscapa* from *T. hookeri*, which also has been reported from Wind Cave NP, without using technical characters. Plants must be in full to late flower for identification (April - May). *T. hookeri* has very narrow, linear-subulate involucre bracts that have terminal tufts of tangled cilia (hairs). On the inner disk flowers, the pappus (cluster of hairs at the top of the achene) is barely longer than the corolla (flower tube). In *T. exscapa*, the bracts are broader (narrow-lanceolate) and lack the terminal ciliate tuft. On disk flowers, the pappus is significantly longer than the corolla.

Global distribution The easter daisy is found throughout the western and central Great Plains (Barkley *et al.* 1986). In SD, it is known from the south and southwest parts of the state, where it is said to be rare (Van Bruggen 1985).

Distribution at Wind Cave NP Both *Townsendia exscapa* and *T. hookeri* have been reported from Wind Cave NP and the surrounding area. The 1998 survey began too late in the growing season for identification of these townsendias. Four townsendia occurrences were found and documented in the park, but all were past flowering

and not identifiable to species. They are either *T. exscapa* or *T. hookeri*. These occurrences are located in the Red Valley, on Boland Ridge and in the southwest part of the park near Gobbler Pass (see element occurrence maps in Appendix 4).

Habitat Rangewide, the easter daisy is found on open dry plains (Barkley *et al.* 1986; Van Bruggen 1985). Most of the townsendia populations found during the 1998 survey were in little bluestem grassland, often in areas of less vegetative cover. Soils were sandy, often with rocks and/or gravel. The populations were on gentle to moderately steep slopes (up to 20%), with east, south or west aspects. Common associates included little bluestem and a wide variety of prairie forbs. Scattered ponderosa pine were present at one site. Townsendia habitat at Wind Cave NP is shown in Fig. 10.

Abundance The townsendia occurrences documented during the 1998 survey ranged in estimated size from five to 14 individuals. Populations are probably significantly larger, as survey was done well after the blooming period for townsendias (April - May). Plants are inconspicuous even when in full flower, and are difficult to see later in the season.

Other comments Both *Townsendia exscapa* and *T. hookeri* appear to be rare in SD, and are considered species of special concern by the SDNHP (1998). Only four townsendia occurrences were found in Wind Cave NP. Even if they were all one of the two species of concern, this would not be enough new records to consider removing either species from the list of plants tracked by the SDNHP. Townsends are difficult to survey as flowers are needed for identification, and both species bloom very early in the growing season (April - May). In addition, townsends are small and inconspicuous. It is possible that one or both species may be significantly more common than they currently appear to be. Additional survey early in the growing season is needed throughout the range of the two species in south and southwest SD.

At this time, both townsendia species should be considered of special concern at the park. Existing townsendia populations should be left undisturbed. The townsendia species are not sufficiently rare regionally nor globally to warrant active habitat management. Survey early in the growing season (April - May) is needed to determine the identity of known townsendia populations, and to document the locations and abundance of both species within the park.

Figure 9. Drawing of *Townsendia exscapa*, the easter daisy (Hitchcock and Cronquist 1976).

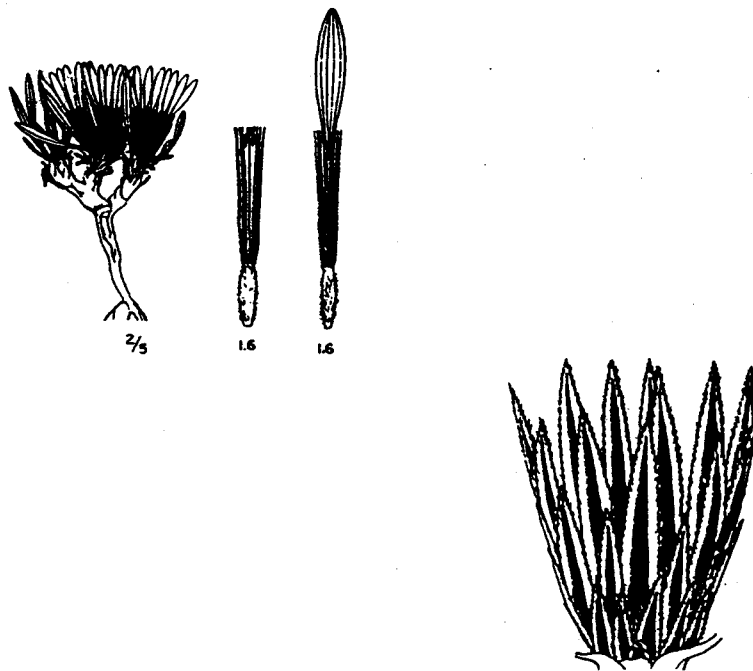


Figure 10. Photographs of *Townsendia* sp. (either *exscapa* or *hookeri*) and habitat at Wind Cave NP; near Hwy 385 ca 0.5 mi northwest of Gobbler Pass; photo by C. Reed, 13 AG 98.



Townsendia hookeri
HOOKER'S TOWNSEND-DAISY or HOOKER'S TOWNSENDIA
Asteraceae (Aster Family)

Status The easter daisy is ranked G5SU by the SDNHP (1998), i.e. it is globally common, but its status in SD is unknown (natural heritage ranks are explained in Appendix 5). It may be rare in the state, but only limited documentation currently is available. There are identification problems also, i.e. it can be difficult to distinguish *T. hookeri* from *T. exscapa*, the easter daisy.

Technical description Dwarf acaulescent subcespitose perennial, arising from thickened branches of a taprooted caudex. Leaves tufted, linear or narrowly lanceolate, often involute, sericeous-canescens, 1-4.5 cm long and ca 2 mm wide. Heads sessile or rarely short-pedunculate among the leaves; involucre 1-1.5 cm tall; involucre bracts linear-subulate with a terminal tuft of ciliate hairs; ray florets 15-30, ligule white above but creamy or pinkish beneath, 9-15 mm long; disk florets yellow or sometimes pinkish-tipped, 4-6+ mm long. Achenes compressed, pubescent; pappus of barbellate bristles; disk pappus equalling or barely exceeding the disk corolla (Barkley *et al.* 1986).

Non-technical description and field characters Hooker's townsend-daisy is a small, low perennial herb, rarely greater than 5 cm in height. Leaves are linear and clustered at the base of the plant. The one-to-few flowering heads also are attached near the base of the plant, surrounded by the leaves. The strap-shaped outer ray flowers are white to pinkish. The inner, tubular disk flowers are yellow, sometimes with pink or purple tinges at the top. Hooker's townsend-daisy is shown in Fig. 10.

It is difficult to distinguish *Townsendia hookeri* from *T. exscapa*, which also has been reported from Wind Cave NP, without using technical characters. Plants must be in full to late flower for identification (April - May). *T. hookeri* has very narrow, linear-subulate involucre bracts that have terminal tufts of tangled cilia (hairs). On the inner disk flowers, the pappus (cluster of hairs at the top of the achene) is barely longer than the corolla (flower tube). In *T. exscapa*, the bracts are broader (narrow-lanceolate) and lack the terminal ciliate tuft. On disk flowers, the pappus is significantly longer than the corolla.

Global distribution Hooker's townsend-daisy is found in the northwest Great Plains in eastern MT, the Black Hills and northeast WY, extending south along the east edge of the Rocky Mountains in CO (Barkley *et al.* 1986). In SD, it is known from the southwest part of the state, where it is thought to be rare (Van Bruggen 1985).

Distribution at Wind Cave NP Both *Townsendia exscapa* and *T. hookeri* have been reported from Wind Cave NP and the surrounding area. The 1998 survey began too late in the growing season for identification of these townsendias. Four townsendia occurrences were found and documented in the park, but all were past flowering

and not identifiable to species. They are either *T. exscapa* or *T. hookeri*. These occurrences are located in the Red Valley, on Boland Ridge and in the southwest part of the park near Gobbler Pass (see element occurrence maps in Appendix 4).

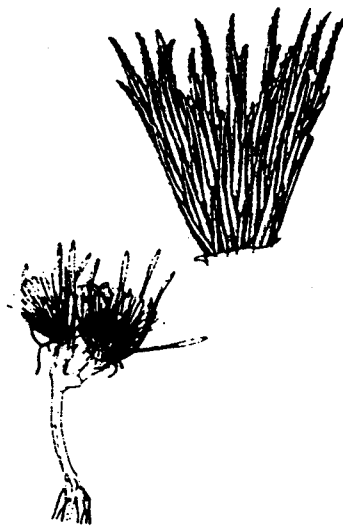
Habitat Rangewide, Hooker's townsend-daisy is found on open dry plains and hillsides (Barkley *et al.* 1986; Van Bruggen 1985). Most of the townsendia populations found during the 1998 survey were in little bluestem grassland, often in areas of less vegetative cover. Soils were sandy, often with rocks and/or gravel. The populations were on gentle to moderately steep slopes (up to 20%), with east, south or west aspects. Common associates included little bluestem and a wide variety of prairie forbs. Scattered ponderosa pine were present at one site. Townsendia habitat at Wind Cave NP is shown in Fig. 10.

Abundance The townsendia occurrences documented during the 1998 survey ranged in size from five to 14 individuals, covering areas from 0.1 to 1 acre. Populations are probably significantly larger, as survey was done well after the blooming period for townsendias (April - May). Plants are inconspicuous even when in full flower, and are difficult to see later in the season.

Other comments Both *Townsendia exscapa* and *T. hookeri* appear to be rare in SD, and are considered species of special concern by the SDNHP (1998). Only four townsendia occurrences were found in Wind Cave NP. Even if they were all one of the two species of concern, this would not be enough new records to consider removing either species from the list of plants tracked by the SDNHP. Townsendias are difficult to survey as flowers are needed for identification, and both species bloom very early in the growing season (April - May). In addition, townsendias are small and inconspicuous. It is possible that one or both species may be significantly more common than they currently appear to be. Additional survey early in the growing season is needed throughout the range of the two species in south and southwest SD.

At this time, both townsendia species should be considered of special concern at the park. Existing townsendia populations should be left undisturbed. The townsendia species are not sufficiently rare regionally nor globally to warrant active habitat management. Survey early in the growing season (April - May) is needed to determine the identity of known townsendia populations, and to document the locations and abundance of both species within the park.

Figure 11. Drawing of *Townsendia hookeri*, Hooker's townsend-daisy (Hitchcock and Cronquist 1976).



Other Species Previously Reported for Wind Cave NP

Three additional plant species of special concern (SDNHP 1998) have been reported for Wind Cave NP, but were not found during the 1998 survey. These are briefly described below.

Ipomopsis spicata: The spiked gilia (Polemoniaceae) was collected on a W-facing slope on Gobbler Ridge in 1978 by L. L. Worchester (collection #19; SD State University at Brookings). The location of the collection site is T6S R5E Sec 24 NW4, at 4100 ft. elevation. However, the range given on the herbarium label places the site outside of the park (error?). It was not relocated in 1998. Habitat is described as "extremely stony soil of loam or finer texture." *I. spicata* is known from UT east to western SD, and south to NM and western KS (Barkley *et al.* 1986). In SD, it is reported as rare on dry plains in the southwest part of the state (Van Bruggen 1985), but is ranked G4?S4? by the SDNHP (1998) suggesting that it may be significantly more common.

When the site described above was searched in 1998, a population of *Ipomopsis congesta* ssp. *pseudotypica* (ball-head gilia) was found. This taxon is similar to *I. congesta*, and the two can be difficult to distinguish, for example when plants are immature, or dwarfed due to harsh growing conditions. In the spiked gilia, the filaments are shorter than the anthers (vs. longer in *I. congesta*), and the style is included in the flower, being about 1/2 the length of the corolla tube. In *I. congesta*, the style is much longer, at least equal to the corolla tube or even exserted. The specimen at SD State University at Brookings should be requested to verify its identity, and determine its relationship to material collected in 1998.

Elymus diversiglumis (= *E. interruptus*): The interrupted wildrye or Texas wildrye (Poaceae) was reported from a vegetation plot done by Hoffman and Alexander (1987) in the vicinity of Beaver Creek near the east park boundary. The location of the plot site is T5S R5E Sec 30 SE, at 4100 ft. elevation. No collection is cited. The species was not relocated in 1998. It was collected from a steep (30%) NNE-facing slope in ponderosa pine forest with snowberry and poison ivy. *Elymus diversiglumis* is known from Canada south to WI, IA, western SD and northeast WY (Barkley *et al.* 1986). In SD, it is reported as rare in rich moist soil in the western part of the state (Van Bruggen 1985), and is ranked G3?SU by the SDNHP (1998).

This species can be difficult to separate from *E. canadensis*, Canadian wildrye, which is fairly common at Wind Cave NP. Without a specimen, it is impossible to verify the presence of interrupted wildrye in the park.

Stipa robusta: Sleepy grass (Poaceae) was collected in the park in 1924 by W. H. Over (collection #?; University of SD at Vermillion). No additional location information is given. Habitat is described as "open woods." The main range of sleepy grass is NM, AZ, west TX and southern CO (Hitchcock, rev. Chase 1950), and it has been found at scattered locations in eastern WY, western SD and KS (Barkley *et al.* 1986).

In SD, it is reported as rare in dry prairie and openings in the Black Hills (Van Bruggen 1985). It is ranked G5SU by the SDNHP (1998).

Sleepy grass was not relocated in 1998. Many robust specimens of *Stipa viridula*, green needlegrass, were found. Robust individuals of green needlegrass can be difficult to distinguish from sleepy grass. Over's 1924 collection (University of SD at Vermillion) should be requested and examined to see how it compares with green needlegrass material from the park.

Other Species of Special Concern Reported for the Wind Cave NP Area

Forty-seven additional plant species tracked by the SDNHP have been reported for the major drainage that includes Wind Cave NP, but outside of the park. Of these, eight were thought to possibly occur within the park based on habitat needs, but none of these were found during the 1998 survey. These species are listed in Table 1.

Summary and Discussion

The flora of Wind Cave NP is now known to include 495 taxa of vascular plants. An additional 15 species have been reported for the park, but documentation either does not exist, is inadequate (e.g. immature material) or specimens need to be verified. Of the species that have been reported for the park, seven are considered species of special concern for SD (SDNHP 1998). No Federally-listed (Threatened, Endangered) species nor candidates for listing are known from the park.

The scarcity of rare plant species at Wind Cave NP is consistent with patterns of plant rarity in the Black Hills and surrounding Great Plains. No endemic, globally-rare taxa are known from the Black Hills (or perhaps they have not yet been recognized taxonomically). There are plants endemic to the surrounding Great Plains, and these might be found in the Black Hills at lower elevations. For example, the ball-head gilia (*Ipomopsis congesta* var. *pseudotypica*), which was found in the park during this project, is an endemic species of the north-central Great Plains. This plant is sufficiently common that it is not tracked by the SDNHP.

Most rare plants in the Black Hills fall into one of two groups. The first includes species that occur in the Black Hills as populations widely disjunct (separated) from their main range, generally to the north. These are thought to be relics from earlier cooler wetter climates, and are typically found in the most mesic habitats in the Black Hills. The second group of rare species includes those that grow in the Black Hills at the periphery of their overall range.

Because Wind Cave NP is located in the warmer, drier and lower southern foothills, it is unlikely that the first type of Black Hills rare plant, the northern disjuncts, would occur there. One would expect to find the second type of rare plant at Wind Cave NP, and most commonly, those peripheral species that require drier warmer habitat. For example, many Great Plains and prairie species are near the western or northern extent of their range in the area of the Black Hills. Wind Cave

NP, with its extensive grasslands, might provide habitat for these peripheral species.

All of the species of special concern currently known from the park do fall into the second category of rare plants, those at the periphery of their overall range. The hedgehog cactus, hopi-tea and sleepy grass all are southern species at their northern or northwestern extent in western SD. The easter daisy is a Great Plains species near the western edge of its range. The main range of Hooker's townsend-daisy and the spiked gilia is to the west. The interrupted wildrye is a northern species near its southern limit in the Black Hills.

Management Recommendations and Further Research

None of the species of special concern currently known from Wind Cave NP are sufficiently rare globally or regionally to warrant active habitat management. However project planning should take into consideration known populations of several species to avoid disturbance: hopi-tea, easter daisy and Hooker's townsend-daisy. Townsendia populations found during 1998 were not identifiable to species, but are either the easter daisy or Hooker's townsend-daisy. No other townsendia species of this type ("stemless") are known from the Black Hills.

The hedgehog cactus is sufficiently abundant in the park that it is not currently of management concern. The park's policy prohibiting collection should be sufficient to protect the species within park. Its status in SD outside of Wind Cave NP is poorly known, and so downlisting for the state is not recommended.

Three other species tracked by the SDNHP had been previously reported for Wind Cave NP, but were not relocated during the 1998 survey. All of these species (spiked gilia, interrupted wildrye and sleepy grass) can be difficult to distinguish from closely-related species also found in the park. Voucher specimens for these reports should be requested, examined and compared with material found in the park.

The 1998 survey resulted in a significant increase in the size of the vascular plant flora known from Wind Cave NP. Although the flora is now well-characterized, it is likely that some new species will be added with further survey. The areas most likely to yield additions to the flora are those with higher diversity within and among sites, including prairie dog towns, disturbed sites and riparian areas.

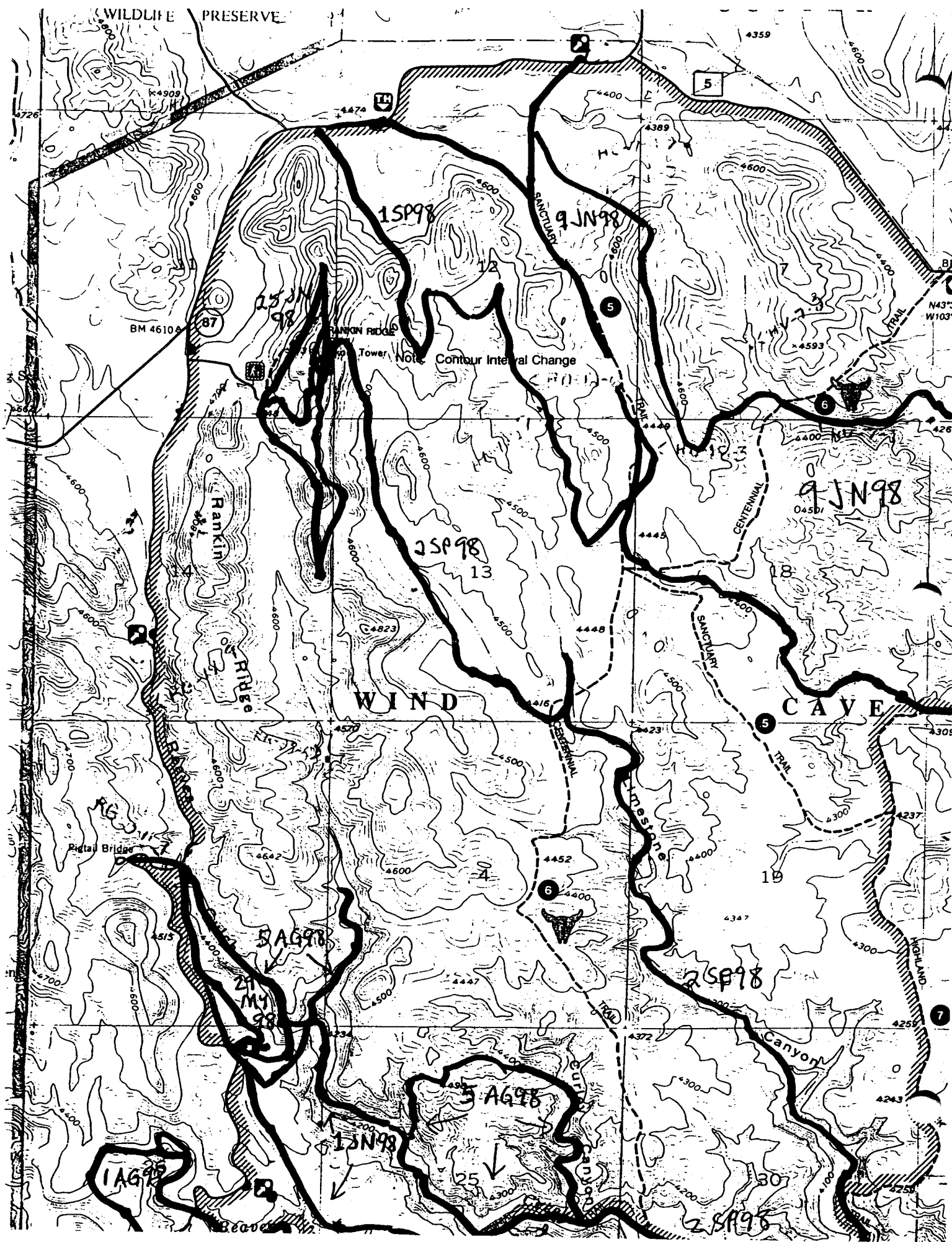
Literature Cited

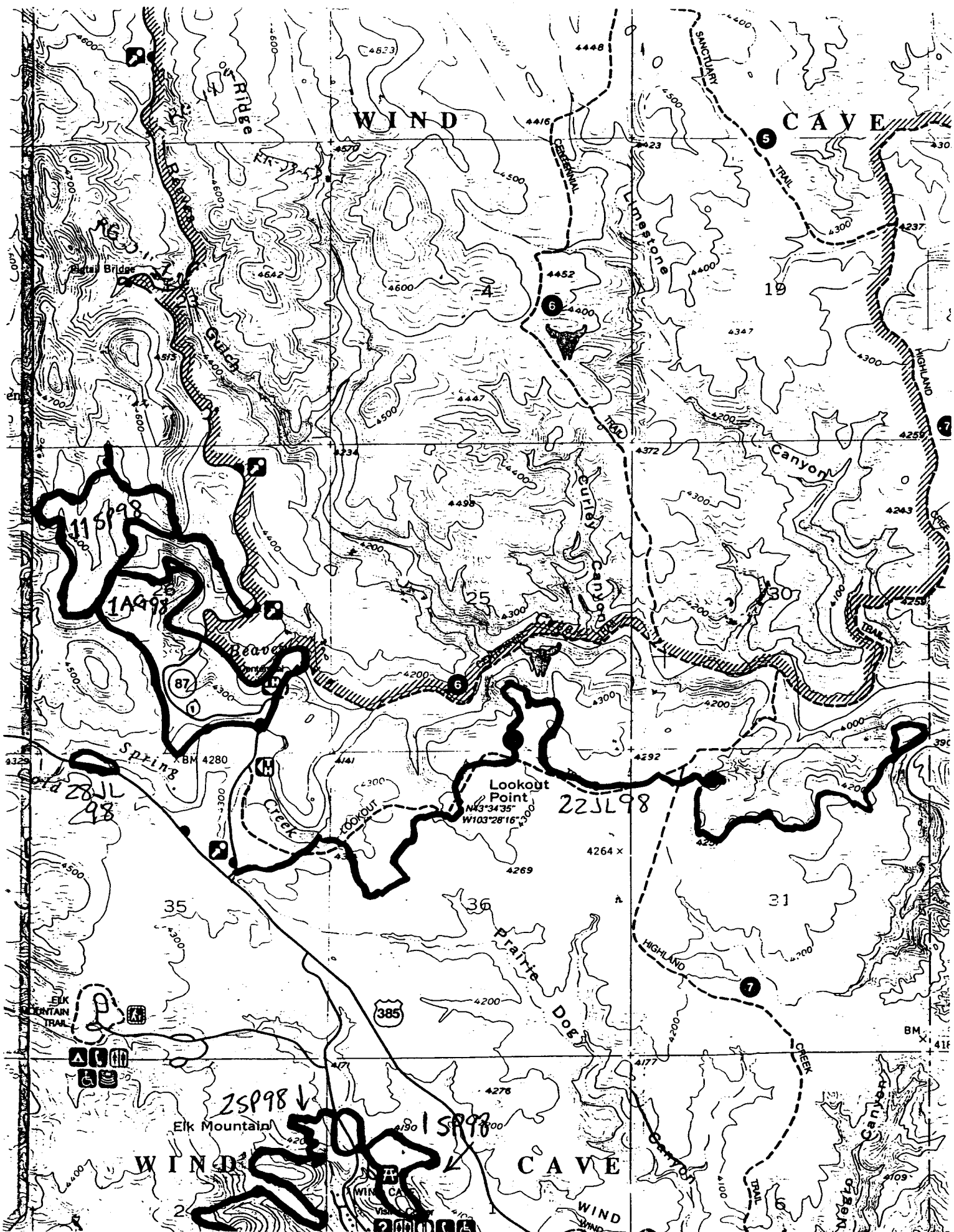
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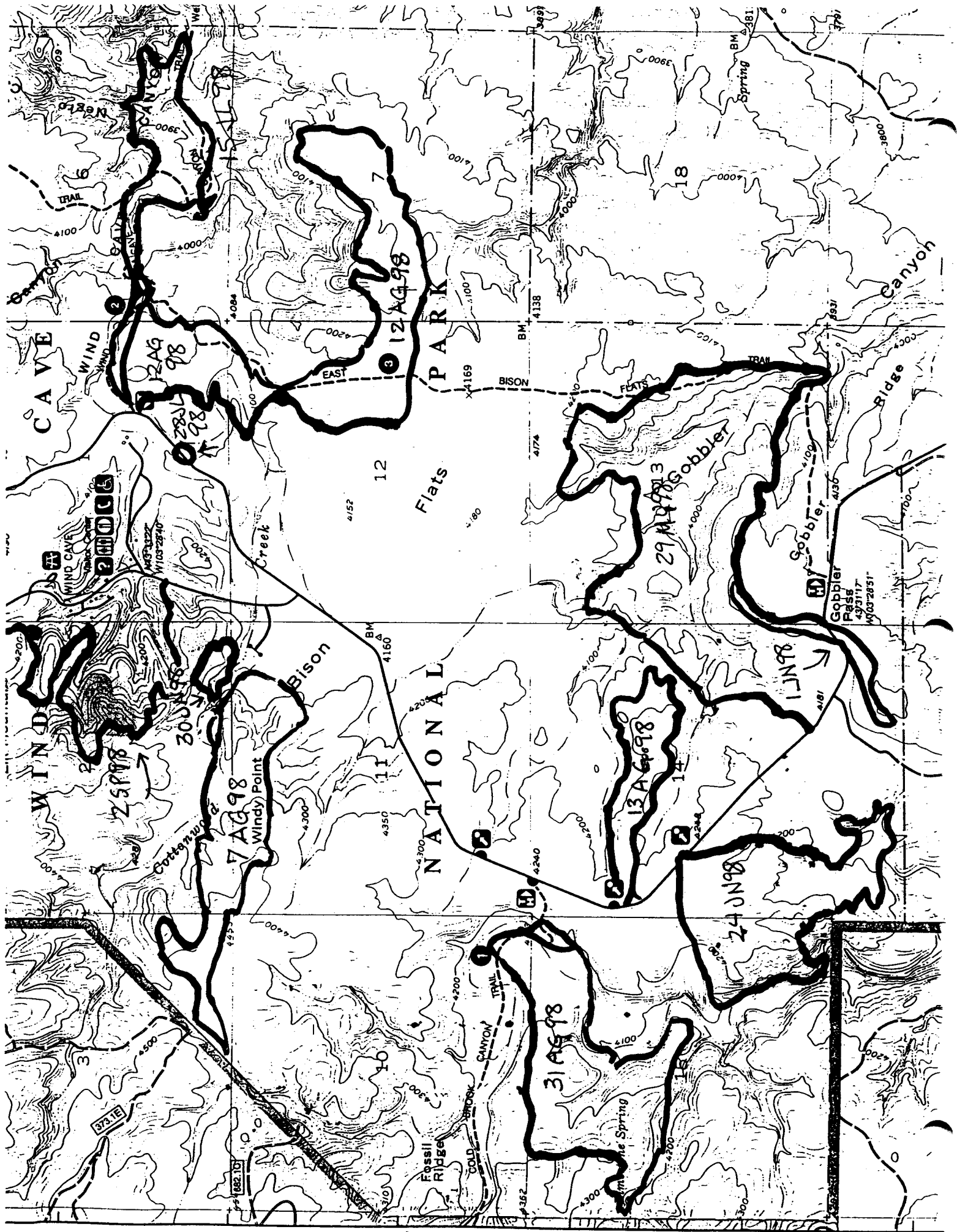
Department Of Game, Fish And Parks, January 29, 1998.

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Appendix 1. Survey Sites and Routes



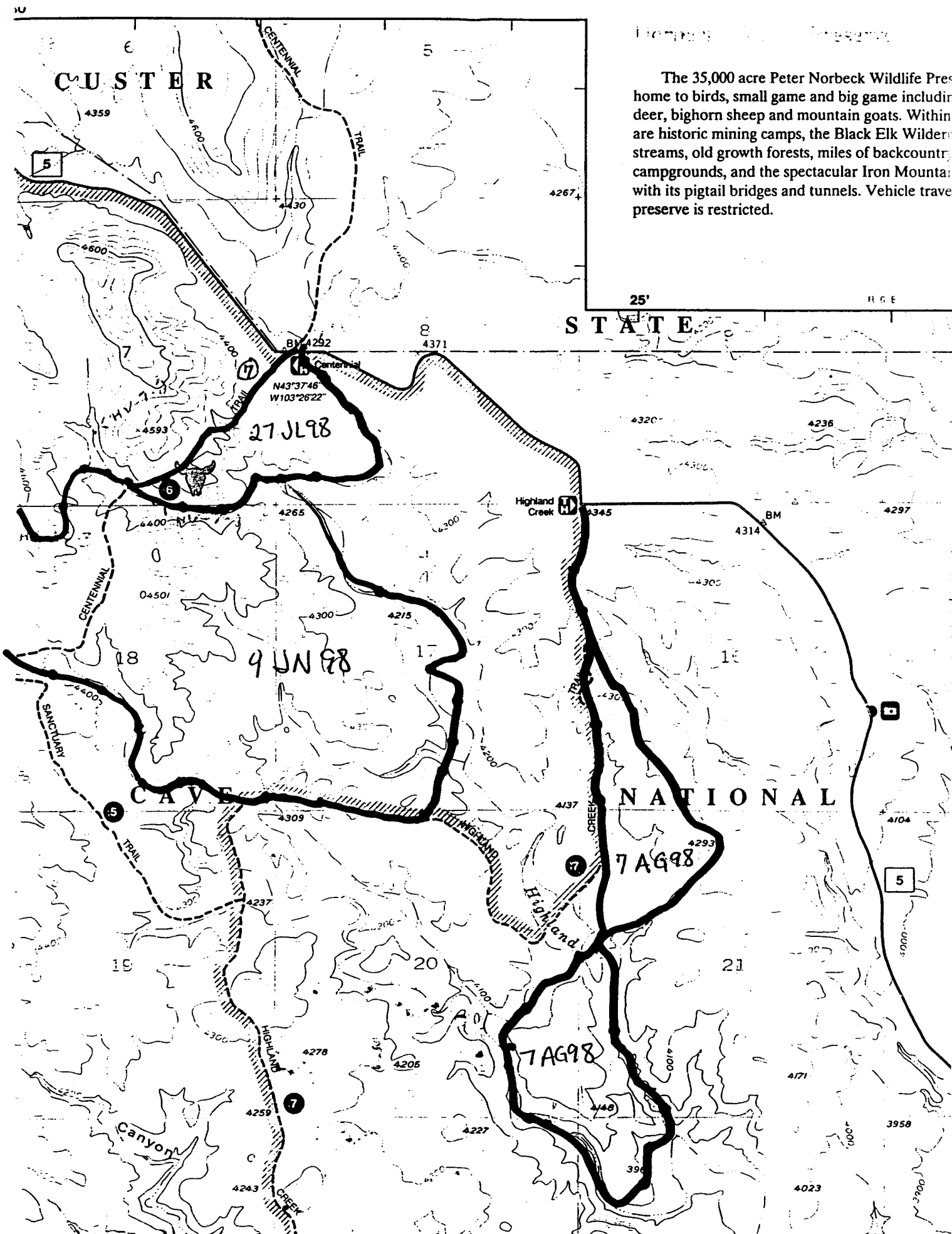


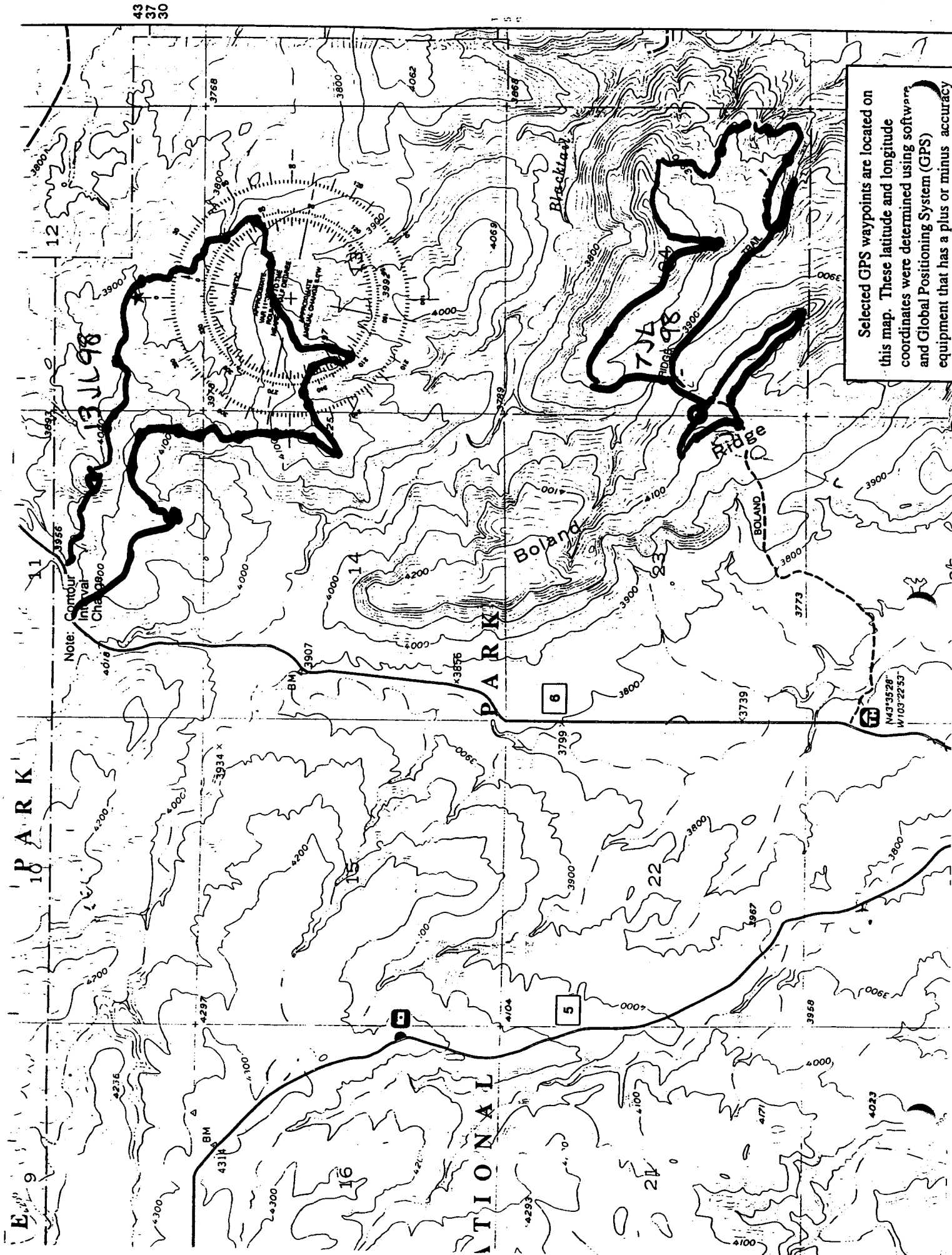


The 35,000 acre Peter Norbeck Wildlife Preserve is home to birds, small game and big game including deer, bighorn sheep and mountain goats. Within are historic mining camps, the Black Elk Wilderness streams, old growth forests, miles of backcountry campgrounds, and the spectacular Iron Mountain with its pigtail bridges and tunnels. Vehicle travel preserve is restricted.

25' H & E

STATE





Selected GPS waypoints are located on this map. These latitude and longitude coordinates were determined using software and Global Positioning System (GPS) equipment that has a plus or minus accuracy

NATIONAL

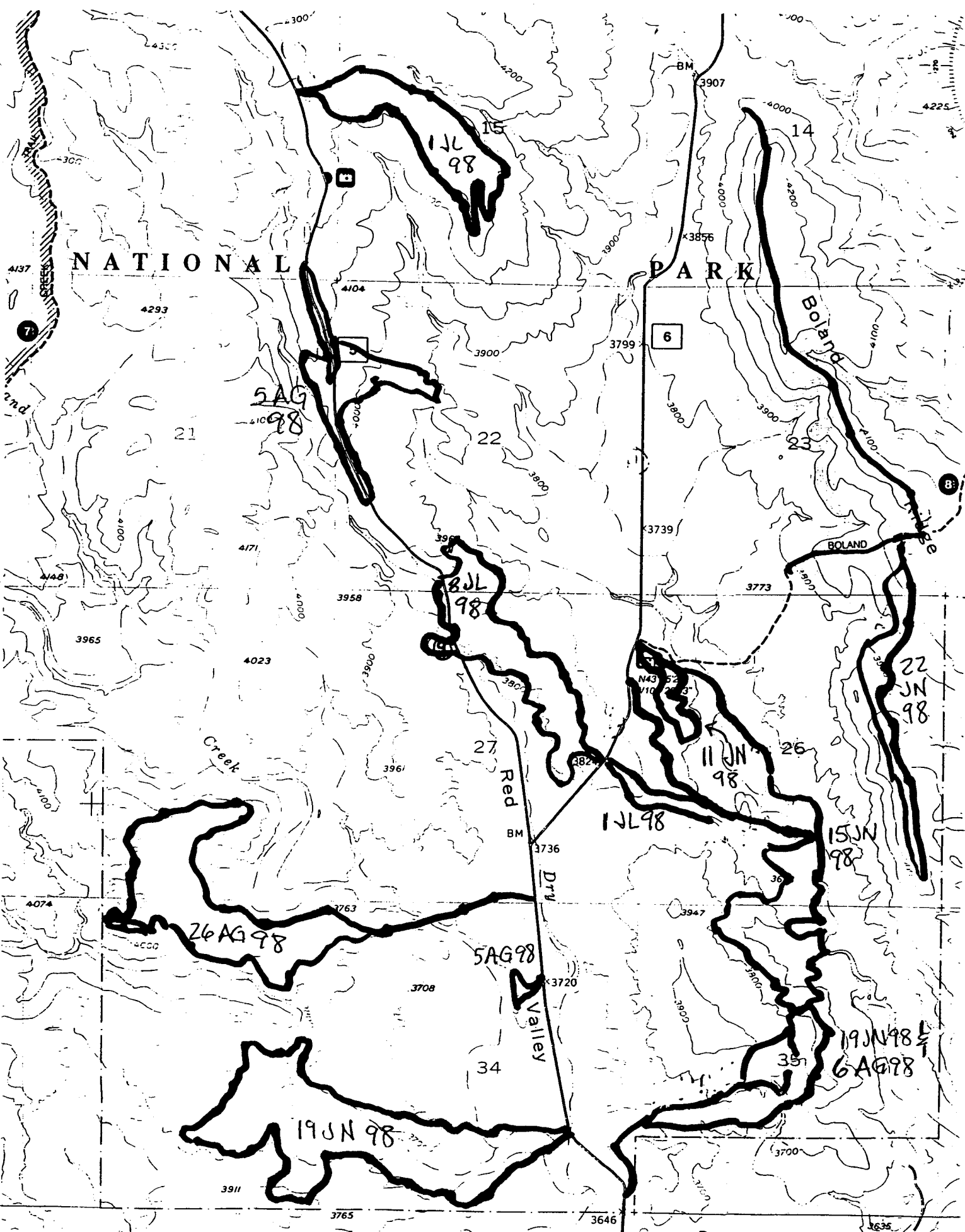
PARK

Boland

BOLAND

Red
BM
Dry

Valley



Appendix 2. Field Survey Form

South Dakota Natural Heritage Program
Dept. Game, Fish & Parks
523 E. Capitol, Pierre SD 57501
RARE PLANT SURVEY FORM

Wyoming Natural Diversity Database
1604 Grand Ave., Laramie, WY 82070

Date of Survey _____ Observers _____

Species Name _____

Location (Attach copy of pertinent topo map with population location shown if available)

USGS Quad _____ County _____

Township _____ Range _____ Section _____
1/4 Sec _____

Directions to site _____

Forest Service District/BLM Resource Area _____
Other Managed Area (e.g. National Park) _____

Biology Estimated # of individuals _____

% Flowering _____ % Fruiting _____ % Vegetative _____

Habitat Vegetation Type _____

Associated Species _____

Aspect (N, S, NW, etc) _____ % Slope _____ Light exposure _____
Soil Moisture _____

Soil/substrate _____

Elevation _____ Size _____ (acres)

Land use _____

Documentation Specimen (Collector/coll. #) _____

Photograph Taken ? _____ Identification confirmed ? _____

Additional Comments (continue on back): (include potential threats, protection or management recommendations if appropriate)

Appendix 3. Flora of Wind Cave National Park

Nomenclature follows Barkley *et al.* 1986 (Flora of the Great Plains) except in the few cases where recent changes are now in popular use. Common names are from the current USDA NRCS Plants database except in cases where other names are in widespread use regionally.

NOTE: species without adequate documentation (verified voucher specimen or other reliable report) are marked "*" or "**?" with comments in the third column.

Aceraceae

Acer negundo var. *interius* (Britt.) Sarg.

boxelder maple

Amaranthaceae

Amaranthus graecizans auct. non L.

mat amaranth

Amaranthus retroflexus L.

redroot amaranth

Rhus aromatica var. *trilobata* (Nutt.) Gray

skunkbush sumac

Rhus glabra L.

smooth sumac

Toxicodendron rydbergii (Small ex Rydb.) Greene

western poison ivy

Apiaceae

Berula erecta (Huds.) Coville

cutleaf waterparsnip

Cicuta douglasii (DC.) Coult. & Rose

western water hemlock

Conium maculatum L.

poison hemlock

Cymopterus montanus Nutt. ex Torr. & Gray

mountain springparsley

Heracleum sphondylium L.

eltrot

Lomatium foeniculaceum (Nutt.) Coult. & Rose

desert biscuitroot

Musineon tenuifolium (Nutt. ex Torr. & Gray) Coult. & Rose

slender wildparsley

Osmorhiza longistylis (Torr.) DC.

longstyle sweetroot

Sanicula marilandica L.

Maryland sanicle

Apocynaceae

Apocynum androsacmifolium L.

spreading dogbane

Apocynum cannabinum L.

Indianhemp

Araliaceae

Aralia nudicaulis L.

Asclepiadaceae

Asclepias incarnata L.

Asclepias ovalifolia Dcne.

Asclepias pumila (Gray) Vail

Asclepias speciosa Torr.

Asclepias stenophylla Gray

**Asclepias verticillata* L.

Asclepias viridiflora Raf.

Asteraceae

Achillea millefolium var. *lanulosa* (Nutt.) Piper

Agoseris glauca (Pursh) Raf.

Ambrosia artemisiifolia L.

Ambrosia psilostachya DC.

Ambrosia trifida L.

Antennaria microphylla Rydb.

Antennaria parvifolia Nutt.

Arctium minus Bernh.

Artemisia campestris L.

Artemisia cana Pursh

Artemisia dracunculus L.

Artemisia frigida Willd.

Artemisia ludoviciana ssp. *ludoviciana* Nutt.

Aster commutatus (Torr. & Gray) Gray

Aster ericoides L.

Aster falcatus Lindl.

Aster hesperius Gray

Aster laevis L.

Aster oblongifolius Nutt.

Bidens cernua L.

wild sarsaparilla

swamp milkweed

ovalleaf milkweed

plains milkweed

showy milkweed

slimleaf milkweed

whorled milkweed

green milkweed

id questionable

western yarrow

pale agoseris

annual ragweed

Cuman ragweed

great ragweed

littleleaf pussytoes

smallleaf pussytoes

lesser burdock

field sagewort

silver sagebrush

wormwood

fringed sagewort

foothill sagewort

white aster

heath aster

cluster aster

an aster

smooth aster

aromatic aster

nodding beggartick

Carduus nutans L.	musk thistle
Centaurea maculosa auct. non Lam.	spotted knapweed
Chrysopsis villosa (Pursh) Nutt. ex DC.	hairy goldenaster
Cirsium arvense (L.) Scop.	Canadian thistle
Cirsium flodmanii (Rydb.) Arthur	Flodman's thistle
Cirsium undulatum (Nutt.) Spreng.	wavyleaf thistle
Cirsium vulgare (Savi) Ten.	bull thistle
Conyza canadensis (L.) Cronq.	Canadian horseweed
Conyza ramosissima Cronq.	dwarf horseweed
Dyssodia papposa (Vent.) A.S. Hitchc.	fetid marigold
Echinacea angustifolia DC.	blacksamson echinacea
Engelmannia pinnatifida Gray ex Nutt.	Engelmann's daisy
Erigeron acris L.	bitter fleabane
Erigeron canus Gray	hoary fleabane
Erigeron flagellaris Gray	trailing fleabane
Erigeron glabellus Nutt.	streamside fleabane
*Erigeron ochroleucus Nutt.	buff fleabane
Erigeron philadelphicus L.	Philadelphia fleabane
Erigeron strigosus Muhl. ex Willd.	prairie fleabane
Erigeron subtrinervis Rydb. ex Porter & Britt.	threenerve fleabane
Eupatorium maculatum L.	spotted joepeyweed
Gnaphalium viscosum Kunth	sticky cudweed
Grindelia squarrosa (Pursh) Dunal	curlycup gumweed
Gutierrezia sarothrae (Pursh) Britt. & Rusby	broom snakeweed
Haplopappus spinulosus (Pursh) DC.	lacy tansyaster
Helianthus annuus L.	common sunflower
Helianthus maximiliani Schrad.	Maximilian sunflower
Helianthus nuttallii Torr. & Gray	Nuttall's sunflower
Helianthus rigidus (Cass.) Desf.	a sunflower
Hieracium albiflorum Hook.	white hawkweed
Hieracium umbellatum L.	narrowleaf hawkweed
Hymenopappus filifolius Hook.	fineleaf hymenopappus
Hymenoxys acaulis (Pursh) Parker	stemless hymenoxys
	no specimen
	id questionable

<i>Iva xanthifolia</i> Nutt.	giant sumpweed
<i>Kuhnia eupatorioides</i> L.	false boneset
<i>Lactuca canadensis</i> L.	Canada lettuce
<i>Lactuca oblongifolia</i> Nutt.	wild lettuce
<i>Lactuca serriola</i> L.	prickly lettuce
<i>Liatis punctata</i> Hook.	dotted gayfeather
<i>Lygodesmia juncea</i> (Pursh) D. Don ex Hook.	rush skeletonplant
<i>Machaeranthera grindelioides</i> (Nutt.) Shinnery	rayless aster
<i>Microseris cuspidata</i> (Pursh) Schultz-Bip.	a microseris
<i>Picradeniopsis oppositifolia</i> (Nutt.) Rydb. ex Britt.	oppositeleaf bahia
<i>Ratibida columnifera</i> (Nutt.) Woot. & Standl.	upright prairie coneflower
<i>Ratibida tagetes</i> (James) Barnh.	green prairie coneflower
<i>Rudbeckia hirta</i> L.	blackeyed Susan
<i>Senecio canus</i> Hook.	woolly groundsel
<i>Senecio eremophilus</i> var. <i>eremophilus</i> Richards.	desert groundsel
<i>Senecio integerrimus</i> var. <i>integerrimus</i> Nutt.	lambstongue groundsel
<i>Senecio plattensis</i> Nutt.	prairie groundsel
<i>Senecio riddellii</i> Torr. & Gray	Riddell's ragwort
<i>Solidago canadensis</i> L.	Canada goldenrod
<i>Solidago gigantea</i> Ait.	giant goldenrod
<i>Solidago missouriensis</i> Nutt.	Missouri goldenrod
<i>Solidago mollis</i> Bartl.	velvety goldenrod
<i>Solidago nemoralis</i> Ait.	Dyersweed goldenrod
<i>Solidago ptarmicoides</i> (Nees) Boivin	white-flowered goldenrod
<i>Solidago rigida</i> L.	a goldenrod
<i>Solidago speciosa</i> Nutt.	showy goldenrod
<i>Sonchus asper</i> (L.) Hill	spiny sowthistle
<i>Thelesperma filifolium</i> (Hook.) Gray	stiff greenthread
<i>Thelesperma megapotamicum</i> (Spreng.) Kuntze	Hopi tea greenthread
<i>Townsendia exscapa</i> (Richards.) Porter	stemless townsendia
<i>Townsendia hookeri</i> Beaman	Hooker's townsendia
<i>Tragopogon dubius</i> Scop.	yellow salsify
<i>Tragopogon pratensis</i> L.	meadow salsify

Betulaceae

Betula occidentalis Hook.
Betula papyrifera Marsh.
**Corylus cornuta* Marsh.

Boraginaceae

Cryptantha celosioides (Eastw.) Payson
Cryptantha minima Rydb.
Cryptantha thysiflora (Greene) Payson
Cynoglossum officinale L.
Hackelia deflexa (Wahlenb.) Opiz
**Lappula echinata* Gilib.
Lappula redowskii auct. non (Hornem.) Greene
Lithospermum incisum Lehm.
Mertensia lanceolata (Pursh) DC.
Onosmodium molle ssp. occidentale (Mackenzie) Cochrane

Brassicaceae

Alyssum alyssoides (L.) L.
Alyssum desertorum Stapf
Arabis hirsuta ssp. *pyncocarpa* (M. Hopkins) Hulten
Arabis holboellii var. *pinetorum* (Tidestrom) Rollins
Camelina microcarpa DC.
Capsella bursa-pastoris (L.) Medik.
Chorispora tenella (Pallas) DC.
Descurainia pinnata (Walt.) Britt.
Draba reptans (Lam.) Fern.
Erysimum asperum (Nutt.) DC.
Erysimum capitatum (Dougl. ex Hook.) Greene
Erysimum cheiranthoides L.
Hesperis matronalis L.
Lepidium densiflorum Schrad.
**Lesquerella alpina* (Nutt.) S. Wats.

water birch
paper birch
beaked hazelnut
no specimen
id questionable

buttecandle
little catseye
calcareous catseye
houndstongue
nodding stickseed
a stickseed
flatspine stickseed
narrowleaf gromwell
lanceleaf bluebells
western onosmodium
id questionable, immature

pale madwort
desert madwort
a rockcress
Holboell's rockcress
littlepod falseflax
shepherd's purse
crossflower
western tansymustard
Carolina whitlowgrass
western wallflower
sanddune wallflower
wormseed wallflower
dames rocket
common pepperweed
alpine bladderpod
id questionable, imm.

*Lesquerella arenosa (Richards.) Rydb.
 Lesquerella ludoviciana (Nutt.) S. Wats.
 Nasturtium officinale Ait. f.
 Rorippa palustris (L.) Bess.
 Sisymbrium altissimum L.
 Thlaspi arvense L.

Great Plains bladderpod id questionable, imm.
 foothill bladderpod
 watercress
 bog yellowcress
 tall tumbled mustard
 field pennycress

Cactaceae

Coryphantha missouriensis (Sweet) Britt. & Rose
 Coryphantha vivipara (Nutt.) Britt. & Rose
 Echinocereus viridiflorus Engelm.
 Opuntia humifusa (Raf.) Raf.
 Opuntia polyacantha Haw.

missouri pincushion no specimen
 a pincushion cactus no specimen
 nylon hedgehog cactus
 pricklypear
 plains pricklypear

Callitrichaceae

Callitriche verna L.

vernal waterstarwort

Campanulaceae

Campanula aparinoides Pursh
 Campanula rotundifolia L.
 Lobelia spicata Lam.
 Triodanis leptocarpa (Nutt.) Nieuwl.
 Triodanis perfoliata (L.) Nieuwl.

marsh bellflower
 bluebell bellflower
 palespike lobelia
 slimpod Venus' lookingglass
 clasping Venus' lookingglass

Cannabaceae

Humulus lupulus L.

common hop

Capparaceae

Cleome serrata Jacq.
 Polanisia dodecandra ssp. trachysperma (Torr. & Gray) Iltis

toothed spiderflower
 sandyseed clammyweed

Caprifoliaceae

Symphoricarpos albus (L.) Blake

common snowberry

Symphoricarpos occidentalis Hook.
Viburnum lentago L.

western snowberry
nannyberry

Caryophyllaceae

Arenaria hookeri Nutt.
Cerastium arvense L.
Cerastium vulgatum L. 1762, non 1755
Dianthus armeria L.
Paronychia depressa (Torr. & Gray) Nutt. ex A. Nels.
Saponaria officinalis L.
Silene antirrhina L.
Silene drummondii Hook.
Silene pratensis (Rafn) Godr. & Gren.
Stellaria longifolia Muhl. ex Willd.
Stellaria media (L.) Vill.

Hooker's sandwort
field chickweed
big chickweed
Deptford pink
spreading nailwort
bouncingbet
sleepy silene
Drummond's campion
a silene
longleaf starwort
common chickweed

Celastraceae

Celastrus scandens L.

American bittersweet

Chenopodiaceae

**Chenopodium album* L.
Chenopodium berlandieri Moq.
Chenopodium gigantospermum Aellen
Chenopodium pratericola Rydb.
Monolepis nuttalliana (J.A. Schultes) Greene
Salsola iberica Sennen & Pau

lambsquarters id questionable, immature
pitseed goosefoot
mapleleaf goosefoot
desert goosefoot
Nuttall's povertyweed
prickly Russian thistle

Cistaceae

Helianthemum bicknellii Fern.

hoary frostweed

Clusiaceae

Hypericum canadense L.

lesser Canadian St. Johnswort

Commelinaceae

Tradescantia bracteata Small ex Britt.
Tradescantia occidentalis (Britt.) Smyth

Convolvulaceae

Calystegia sepium (L.) R. Br.
Convolvulus arvensis L.
Evolvulus nuttallianus J.A. Schultes
Ipomoea leptophylla Torr.

Cornaceae

Cornus stolonifera Michx.

Crassulaceae

Sedum lanceolatum Torr.

Cucurbitaceae

Echinocystis lobata (Michx.) Torr. & Gray

Cupressaceae

Juniperus communis L. no specimen
Juniperus horizontalis Moench
Juniperus scopulorum Sarg. Rocky Mountain juniper no specimen

Cyperaceae

Carex backii Boott
Carex blanda Dewey
Carex brevior (Dewey) Mackenzie
Carex douglasii Boott
Carex filifolia Nutt.
Carex heliophila Mackenzie
Carex hoodii Boott
Carex hystericina Muhl. ex Willd.
Back's sedge
eastern woodland sedge
fescue sedge
Douglas' sedge
threadleaf sedge
sun sedge
Hood's sedge
bottlebrush sedge

longbract spiderwort
prairie spiderwort

hedge false bindweed
field bindweed
shaggy dwarf morningglory
bush morningglory

redosier dogwood

spearleaf stonecrop

wild cucumber

common juniper
creeping juniper

Rocky Mountain juniper no specimen

Back's sedge
eastern woodland sedge
fescue sedge
Douglas' sedge
threadleaf sedge
sun sedge
Hood's sedge
bottlebrush sedge

Carex lanuginosa Michx.
Carex nebrascensis Dewey
Carex pensylvanica Lam.
Carex richardsonii R. Br.
Carex spengelii Dewey ex Spreng.
Carex vulpinoidea Michx.
Cyperus acuminatus Torr. & Hook. ex Torr.
Cyperus aristatus Rottb.
Cyperus schweinitzii Torr.
Eleocharis palustris (L.) Roemer & J.A. Schultes
Scirpus pallidus (Britt.) Fern.
Scirpus validus Vahl

woolly sedge
 Nebraska sedge
 Pennsylvania sedge
 Richardson's sedge
 Sprengel's sedge
 fox sedge
 tapertip flatsedge
 bearded flatsedge
 Schweinitz's flatsedge
 common spikerush
 cloaked bulrush
 a bulrush

Elaeagnaceae
Shepherdia canadensis (L.) Nutt.

russet buffaloberry

Equisetaceae
Equisetum arvense L.
Equisetum hyemale L.
Equisetum laevigatum A. Braun

field horsetail
 scouringrush horsetail
 smooth horsetail

Ericaceae
Arctostaphylos uva-ursi (L.) Spreng.

kinnikinnick

Euphorbiaceae
Euphorbia dentata Michx.
Euphorbia esula L.
Euphorbia glyptosperma Engelm.
Euphorbia marginata Pursh
Euphorbia robusta (Engelm.) Small
Euphorbia serpyllifolia Pers.
Euphorbia spathulata Lam.
Euphorbia stictospora Engelm.

toothed spurge
 leafy spurge
 a spurge
 snow on the mountain
 Rocky Mountain spurge
 a spurge
 warty spurge
 a spurge
 no specimen

Fabaceae

Amorpha canescens Pursh
Amorpha fruticosa L.
Astragalus adsurgens var. *robustior* Hook.
Astragalus agrestis Dougl. ex G. Don
Astragalus bisulcatus (Hook.) Gray
Astragalus crassicaarpus Nutt.
Astragalus flexuosus (Hook.) Dougl. ex G. Don
Astragalus gilviflorus Sheldon
Astragalus gracilis Nutt.
Astragalus lotiflorus Hook.
Astragalus missouriensis Nutt.
Astragalus spatulatus Sheldon
Dalea aurea Nutt. ex Pursh
Dalea candida Willd.
Dalea enneandra Nutt.
Dalea purpurea Vent.
Glycyrrhiza lepidota Pursh
Lathyrus ochroleucus Hook.
Lupinus argenteus Pursh
Medicago lupulina L.
Melilotus alba Medikus
Melilotus officinalis (L.) Lam.
Oxytropis lambertii Pursh
Oxytropis sericea Nutt.
Psoralea argophylla Pursh
Psoralea cuspidata Pursh
Psoralea esculenta Pursh
Psoralea tenuiflora Pursh
Thermopsis rhombifolia (Nutt. ex Pursh) Nutt. ex Richards.
Vicia americana Muhl. ex Willd.

leadplant
desert indigobush
prairie milkvetch
purple milkvetch
twogrooved milkvetch
groundplum milkvetch
flexile milkvetch
plains milkvetch
slender milkvetch
lotus milkvetch
Missouri milkvetch
tufted milkvetch
golden prairieclover³⁴
slender white prairieclover
nineanther prairieclover
purple prairieclover
American licorice
cream peavine
silvery lupine
black medick
white sweetclover
yellow sweetclover
Lambert's crazyweed
silvery oxytrope
silverleaf scurfpea
largebract Indian breadroot
breadroot scurfpea
slimflower scurfpea
prairie thermopsis
American vetch

Fagaceae

Quercus macrocarpa Michx.

bur oak no specimen

Fumariaceae

Corydalis aurea Willd.

scrambled eggs

Gentianaceae

Gentianella amarella (L.) Boerner

autumn dwarf gentian

Geraniaceae

Geranium pusillum L.

small geranium

**Geranium richardsonii* Fisch. & Trautv.

Richardson's geranium collected in WICA?
Geranium viscosissimum Fisch. & C.A. Mey. ex C.A. Mey.
sticky geranium

Grossulariaceae

Ribes cereum Dougl.

wax currant

Ribes odoratum H. Wendl.

golden currant

Ribes oxycanthoides ssp. *oxycanthoides* L.

Canadian gooseberry
Ribes setosum Lindl.
a gooseberry

Hydrophyllaceae

Ellisia nyctelea (L.) L.

Aunt Lucy

Iridaceae

Iris missouriensis Nutt.

Rocky Mountain iris
Sisyrinchium montanum Greene
mountain blue-eyed grass

Juncaceae

Juncus bufonius L.

toad rush

Juncus dudleyi Wieg.

Dudley's rush

Juncus ensifolius Wikstr.

swordleaf rush

Juncus interior Wieg.

inland rush

Juncus torreyi Coville

Torrey's rush

Lamiaceae

Agastache foeniculum (Pursh) Kuntze
Galeopsis bifida Boenn.
Hedeoma drummondii Benth.
Hedeoma hispida Pursh
Leonurus cardiaca L.
Lycopus americanus Muhl. ex W. Bart.
Marrubium vulgare L.
Mentha arvensis L.
Monarda fistulosa ssp. fistulosa var. menthifolia (Graham) Fern.
Nepeta cataria L.
Prunella vulgaris L.
Salvia azurea Michx. ex Lam.
Salvia reflexa Hornem.
Scutellaria galericulata L.
Stachys palustris L.

Lemnaceae

Lemna minor L.

Liliaceae

Allium cernuum Roth
*Allium geyseri S. Wats.
Allium textile A. Nels. & J.F. Macbr.
Asparagus officinalis L.
Calochortus gunnisonii S. Wats.
Calochortus nuttallii Torr. & Gray
Disporum trachycarpum (S. Wats.) Benth. & Hook. f.
Leucocrinum montanum Nutt. ex Gray
Lilium philadelphicum L.
Polygonatum biflorum (Walt.) Ell.
Smilacina stellata (L.) Desf.
Smilax herbacea var. lasioneura (Hook.) A. DC.

blue giant hyssop
splitlip hempnettle
Drummond's falsepennyroyal
rough falsepennyroyal
common motherwort
American waterhorehound
horehound
wild mint
mintleaf beebalm
catnip
common selfheal
azure blue sage
lanceleaf sage
marsh skullcap
marsh hedgenettle

common duckweed

nodding onion
Geyer's onion
textile onion
garden asparagus
Gunnison's Mariposa lily
sego lily
roughfruit fairybells
common starlily
wood lily
king Solomon's seal
starry false Solomon's seal
carrionflower

id questionable

<i>Yucca glauca</i> Nutt.	
<i>Zigadenus venenosus</i> var. <i>gramineus</i> (Rydb.) Walsh ex M.E. Peck	small soapweed grassy deathcamas
Linaceae	
<i>Linum perenne</i> ssp. <i>lewisii</i> (Pursh) Hulten	blue flax
<i>Linum rigidum</i> Pursh	stiffstem flax
Loasaceae	
<i>Mentzelia decapetala</i> (Pursh ex Sims) Urban & Gilg ex Gilg	tenpetal blazingstar
<i>Mentzelia oligosperma</i> Nutt. ex Sims	chickenthief
Malvaceae	
<i>Sphaeralcea coccinea</i> (Nutt.) Rydb.	scarlet globemallow
Marsileaceae	
<i>Marsilea vestita</i> Hook. & Grev.	hairy pepperwort
Nyctaginaceae	
<i>Mirabilis hirsuta</i> (Pursh) MacM.	hairy four o'clock
<i>Mirabilis linearis</i> (Pursh) Heimerl	narrowleaf four o'clock
<i>Mirabilis nyctaginea</i> (Michx.) MacM.	heartleaf four o'clock
Onagraceae	
<i>Calylophus serrulatus</i> (Nutt.) Raven	yellow sundrops
<i>Circaea lutetiana</i> ssp. <i>canadensis</i> (L.) Aschers. & Magnus	broadleaf enchanter's nightshade
<i>Epilobium angustifolium</i> L.	fireweed
<i>Epilobium ciliatum</i> Raf.	hairy willowherb
<i>Epilobium paniculatum</i> Nutt. ex Torr. & Gray	autumn willowweed
<i>Gaura coccinea</i> Nutt. ex Pursh	scarlet beeblossom
<i>Gaura parviflora</i> Dougl. ex Lehm.	velvetweed
<i>Oenothera albicaulis</i> Pursh	whitest eveningprimrose
<i>Oenothera coronopifolia</i> Torr. & Gray	crownleaf eveningprimrose
<i>Oenothera laciniata</i> Hill	cutleaf eveningprimrose

Oenothera latifolia (Rydb.) Munz
Oenothera nuttallii Sweet
Oenothera villosa Thunb.

mountain eveningprimrose
Nuttall's eveningprimrose
hairy eveningprimrose

Orchidaceae

Corallorrhiza wisteriana Conrad
Spiranthes romanzoffiana Cham.

spring coralroot
hooded ladiestresses

Orobanchaceae

Orobanche fasciculata Nutt.

clustered broomrape

Oxalidaceae

Oxalis dillenii Jacq.
Oxalis stricta L.

Dillen's oxalis
common yellow oxalis

Papaveraceae

Argemone polyanthemus (Fedde) G.B. Ownbey

crested pricklypoppy

Pinaceae

Pinus ponderosa P. & C. Lawson

ponderosa pine

Plantaginaceae

Plantago major L.
Plantago patagonica Jacq.

common plantain
woolly plantain

Poaceae

Agropyron caninum var. unilaterale (Cassidy) C.L. Hitchc. slender wheatgrass
Agropyron cristatum (L.) Gaertn. crested wheatgrass
Agropyron smithii Rydb. western wheatgrass
Agropyron spicatum Pursh bluebunch wheatgrass
Agrostis exarata Trin. spike bentgrass
Agrostis scabra Willd. rough bentgrass
Agrostis stolonifera L. creeping bentgrass

Alopecurus aequalis Sobol.	shortawn foxtail
Andropogon gerardii Vitman	big bluestem
Aristida purpurea Nutt.	purple threeawn
Aristida purpurea var. fendleriana (Steud.) Vasey	Fendler's threeawn
Aristida purpurea var. longiseta (Steud.) Vasey	Fendler threeawn
Bouteloua curtipendula (Michx.) Torr.	sideoats grama
Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths	blue grama
Bouteloua hirsuta Lag.	hairy grama
Bromus commutatus Schrad.	meadow brome
Bromus inermis Leyss.	smooth brome
Bromus tectorum L.	cheatgrass
Buchloe dactyloides (Nutt.) Engelm.	buffalograss
Calamovilfa longifolia (Hook.) Scribn.	prairie sandreed
Catabrosa aquatica (L.) Beauv.	water whorlgrass
Danthonia spicata (L.) Beauv. ex Roemer & J.A. Schultes	poverty danthonia
Dichanthelium oligosanthes (J.A. Schultes) Gould	Heller's rosette grass
Echinochloa crus-galli (L.) Beauv.	barnyardgrass
Elymus canadensis L.	Canada wildrye
*Elymus diversiglumis Scribn. & Ball	interrupted wildrye
Elymus virginicus L.	Virginia wildrye
Eragrostis cilianensis (All.) Lut. ex Janchen	stinkgrass
Eragrostis spectabilis (Pursh) Steud.	purple lovegrass
Festuca octoflora Walt.	six-weeks fescue
Glyceria grandis S. Wats.	American mannagrass
Glyceria striata (Lam.) A.S. Hitchc.	fowl mannagrass
Hordeum jubatum L.	foxtail barley
Hordeum pusillum Nutt.	little barley
Koeleria macrantha (Ledeb.) J.A. Schultes	prairie Junegrass
Muhlenbergia cuspidata (Torr. ex Hook.) Rydb.	plains muhly
Muhlenbergia racemosa (Michx.) B.S.P.	marsh muhly
Munroa squarrosa (Nutt.) Torr.	false buffalograss
Oryzopsis asperifolia Michx.	roughleaf ricegrass
Oryzopsis hymenoides (Roemer & J.A. Schultes) Ricker ex Piper	indian ricegrass

Oryzopsis micrantha (Trin. & Rupr.) Thurb.
Panicum virgatum L.
Phalaris arundinacea L.
Phleum pratense L.
Poa canbyi (Scribn.) T.J. Howell
Poa compressa L.
Poa interior Rydb.
Poa palustris L.
Poa pratensis L.
Poa sandbergii Vasey
Schedonnardus paniculatus (Nutt.) Trel.
Schizachyrium scoparium (Michx.) Nash
Sitanion hystrix (Nutt.) J.G. Sm.
Sorghastrum nutans (L.) Nash
Spartina pectinata Link
Sporobolus airoides (Torr.) Torr.
Sporobolus heterolepis (Gray) Gray
Stipa comata Trin. & Rupr.
 *?*Stipa robusta* (Vasey) Scribn.
Stipa spartea Trin.
Stipa viridula Trin.

Polemoniaceae

Collomia linearis Nutt.
Ipomopsis congesta ssp. *pseudotypica* (Constance & Rollins) Day
 *?*Ipomopsis spicata* (Nutt.) V. Grant
Phlox alyssifolia Greene
Phlox andicola E. Nels.
Phlox hoodii Richards.

Polygalaceae

Polygala alba Nutt.
Polygala verticillata L.

small-seeded ricegrass
 switchgrass
 reed canarygrass
 timothy
 a bluegrass
 Canada bluegrass
 inland bluegrass
 fowl bluegrass
 Kentucky bluegrass
 Sandberg bluegrass
 tumblegrass
 little bluestem
 bottlebrush squirreltail
 yellow Indiangrass
 prairie cordgrass
 alkali sacaton
 prairie dropseed
 needle-and-thread
 sleepy grass
 porcupine grass
 green needlegrass

voucher needs to be verified

narrowleaf mountainrumpet

ballhead gilia
 spiked gilia
 alyssumleaf phlox
 prairie phlox
 spiny phlox

voucher needs to be verified

white milkwort
 whorled milkwort

Polygonaceae

Eriogonum annuum Nutt.
Eriogonum flavum Nutt.
Eriogonum pauciflorum Pursh
Polygonum aviculare L.
Polygonum convolvulus L.
Polygonum lapathifolium L.
Polygonum persicaria L.
Polygonum ramosissimum Michx.
Rumex crispus L.
Rumex venosus Pursh

Polypodiaceae

Cheilanthes feei T. Moore
Pellaea gastonyi Windham
Woodsia oregana D.C. Eat.

Pontederiaceae

Heteranthera limosa (Sw.) Willd.

Portulacaceae

Portulaca oleracea L.
Talinum parviflorum Nutt.

Primulaceae

Anagallis arvensis L.
Androsace occidentalis Pursh
Dodecatheon pulchellum (Raf.) Merr.
Lysimachia ciliata L.

Pyrolaceae

Pyrola chlorantha Sw.
Pyrola elliptica Nutt.

annual buckwheat
yellow eriogonum
fewflower buckwheat
prostrate knotweed
black bindweed
curlytop knotweed
spotted ladysthumb
bushy knotweed
curly dock
veiny dock

slender lipfern
Gastony's cliffbrake
Oregon woodsia

blue mudplantain

little hogweed
sunbright

scarlet pimpernel
western rockjasmine
darkthroat shootingstar
fringed loosestrife

greenflowered wintergreen
waxflower shinleaf

Ranunculaceae

Anemone cylindrica Gray
Anemone patens L.
Anemone virginiana L.
Aquilegia canadensis L.
Clematis ligusticifolia Nutt.
Delphinium bicolor Nutt.
Myosurus minimus L.
Ranunculus abortivus L.
Ranunculus glaberimus Hook.
Ranunculus longirostris Godr.
Ranunculus macounii Britt.
Ranunculus rhomboideus Goldie
Ranunculus sceleratus L.
Ranunculus testiculatus Crantz
Thalictrum dasycarpum Fisch. & Ave-Lall.
Thalictrum revolutum DC.

Rhamnaceae

Rhamnus cathartica L.

Rosaceae

Agrimonia striata Michx.
Amelanchier alnifolia (Nutt.) Nutt. ex M. Roemer
Cercocarpus montanus Raf.
Crataegus chrysocarpa Ashe
Fragaria virginiana Duchesne
Geum canadense Jacq.
Geum triflorum Pursh
Physocarpus monogynus (Torr.) Coult.
Potentilla arguta Pursh
Potentilla concinna Richards.
Potentilla fissa Nutt.

candle anemone
American pasqueflower
tall thimbleweed
red columbine
western white clematis
little larkspur
tiny mouse-ear
littleleaf buttercup
sagebrush buttercup
longbeak buttercup
Macoun's buttercup
prairie buttercup
celeryleaf buttercup
hornseed buttercup
purple meadowrue
waxyleaf meadowrue

common buckthorn

roadside agrimony
Saskatoon serviceberry
true mountain mahogany
fireberry hawthorn
Virginia strawberry
white avens
prairiesmoke
mountain ninebark
tall cinquefoil
elegant cinquefoil
bigflower cinquefoil

Potentilla glandulosa Lindl.
Potentilla hippiana Lehm.
Potentilla norvegica L.
Potentilla pensylvanica L.
Prunus americana Marsh.
Prunus pumila var. *besseyi* (Bailey) Gleason
Prunus virginiana var. *melanocarpa* (A. Nels.) Sarg.
Rosa arkansana Porter
Rosa woodsii Lindl.
Rubus idaeus L.

Rubiaceae

Galium aparine L.
Galium boreale L.
Galium triflorum Michx.

Salicaceae

*?*Populus angustifolia* James
Populus deltoides ssp. *monilifera* (Ait.) Eckenwalder
Populus tremuloides Michx.
Salix amygdaloides Anderss.
Salix bebbiana Sarg.
Salix exigua Nutt.
Salix lutea Nutt.

Santalaceae

Comandra umbellata ssp. *pallida* (A. DC.) Piehl

Saxifragaceae

Heuchera richardsonii R. Br.
Lithophagma parviflorum (Hook.) Nutt. ex Torr. & Gray

gland cinquefoil
 woolly cinquefoil
 Norwegian cinquefoil
 Pennsylvania cinquefoil
 American plum
 western sandcherry
 black chokecherry
 prairie rose
 Woods' rose
 American red raspberry

stickywilly
 northern bedstraw
 fragrant bedstraw

narrowleaf cottonwood not relocated; in WICA?
 plains cottonwood no specimen
 quaking aspen no specimen
 peachleaf willow
 Bebb willow
 sandbar willow
 yellow willow

pale bastard toadflax

Richardson's alumroot
 smallflower woodlandstar

Scrophulariaceae

Bacopa rotundifolia (Michx.) Wettst.
Besseyia wyomingensis (A. Nels.) Rydb.
Castilleja sessiliflora Pursh
Collinsia parviflora Lindl.
Gratiola neglecta Torr.
Linaria canadensis var. texana (Scheele) Pennell
*Linaria vulgaris P. Mill.
Mimulus glabratus Kunth
Orthocarpus luteus Nutt.
Penstemon albidus Nutt.
Penstemon angustifolius Nutt. ex Pursh
Penstemon glaber Pursh
Penstemon gracilis Nutt.
Penstemon grandiflorus Nutt.
Scrophularia lanceolata Pursh
Verbascum thapsus L.
Veronica americana Schwein. ex Benth.
Veronica anagallis-aquatica L.
Veronica catenata Pennell
Veronica peregrina L.

Selaginellaceae

Selaginella densa Rydb.

Solanaceae

Physalis longifolia Nutt.
Physalis virginiana P. Mill.
Solanum rostratum Dunal
Solanum triflorum Nutt.

Sparganiaceae

Sparganium emersum Rehmman

disk waterhyssop
Wyoming besseyia
downy paintedcup
smallflower blue eyed Mary
clammy hedgehyssop
Texas toadflax
butler and eggs
roundleaf monkeyflower
yellow owllover
white penstemon
broadbeard beardtongue
sawsepal penstemon
lilac penstemon
large beardtongue
lanceleaf figwort
common mullein
American speedwell
water speedwell
a speedwell
neckweed

lesser spikemoss

longleaf groundcherry
Virginia groundcherry
buffalobur nightshade
cutleaf nightshade

narrowleaf burreed

Typhaceae

Typha angustifolia L.

narrowleaf cattail

Ulmaceae

Ulmus americana L.

American elm

no specimen

Urticaceae

Parietaria pensylvanica Muhl. ex Willd.

Urtica dioica ssp. *gracilis* (Ait.) Seland.

Pennsylvania pellitory
stinging nettle

Verbenaceae

Phryma leptostachya L.

Verbena bipinnatifida Nutt.

Verbena bracteata Lag. & Rodr.

Verbena hastata L.

Verbena stricta Vent.

American lopseed
Dakota mock vervain
bigbract verbena
swamp verbena
hoary verbena

Violaceae

Viola adunca Sm.

Viola canadensis var. *rugulosa* (Greene) C.L. Hitchc.

Viola nuttallii Pursh

Viola palustris L.

Viola pedatifida G. Don

Viola pratensis Greene

Viola pubescens Ait.

hookedspur violet
creepingroot violet
Nuttall's violet
marsh violet
prairie violet
crowfoot violet
downy yellow violet

Vitaceae

Parthenocissus vitacea (Knerr) A.S. Hitchc.

Vitis riparia Michx.

woodbine
riverbank grape

