

HIGGINS GULCH FLORISTIC INVENTORY



Equisetum scirpoides located during the Higgins Gulch Floristic Inventory.

2-7-2011

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Higgins Gulch Floristic Inventory Final Report
2-7-2011

Prepared for the
Black Hills National Forest
Prepared under contract AG-82X9-D-09-0114
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Introduction

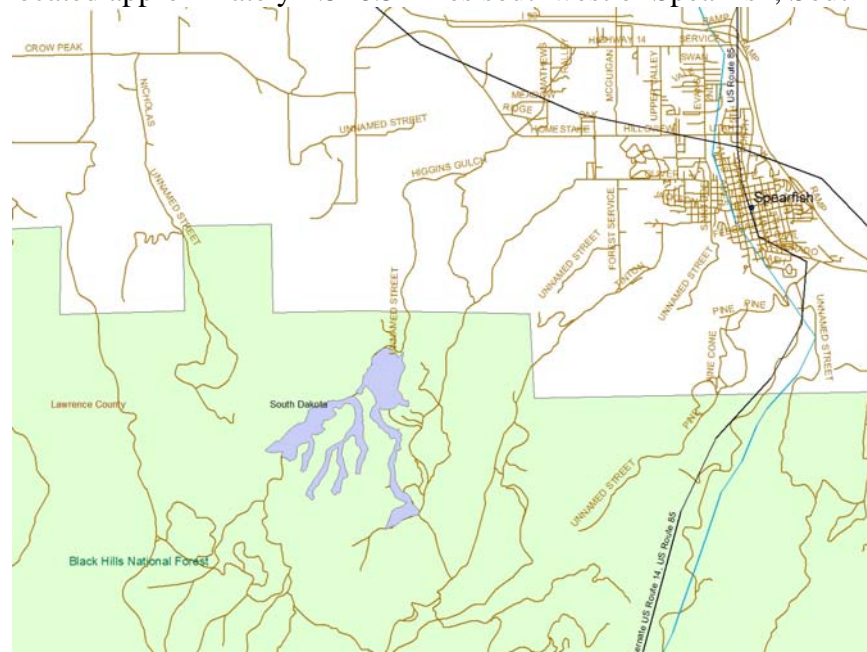
A floristic inventory was initiated during the 2010 field season at Higgins Gulch. This inventory fulfilled several goals. It documents and gives insight on the current flora vegetation at a botanically unique site on the Black Hills National Forest. In addition to documenting the general flora, many species of concern were also documented, including rare species as well as introduced species and noxious weeds. Four hundred and twenty two vouchers (pressed and dried plant specimens) were created as a result of the inventory and these vouchers will be deposited in the Black Hills State University Herbarium in Rapid City, South Dakota where they will be available for study and reference by botanists from the Black Hills. Duplicates will be deposited in the Rocky Mountain Herbarium in Laramie, Wyoming. These vouchers represent a permanent record of the Higgins Gulch flora as it exists in 2010. They represent a baseline useful for comparisons of vegetation change over time and are thus valuable for future studies. Such information may also be used to inform management decisions affecting vegetation at the site.

Geographic Location

The Higgins Gulch floristic inventory is located in Lawrence County, South Dakota. The site is approximately 4.5–6.5 miles southwest of Spearfish, South Dakota in the low hills south of Interstate 90. Prominent geographic features near and within the site include Higgins Gulch, Griggs Gulch, and Crow Peak. The inventory took place on approximately 516 acres. Maps 1 and 2 (below) show an overview and detailed view of the project area boundaries.

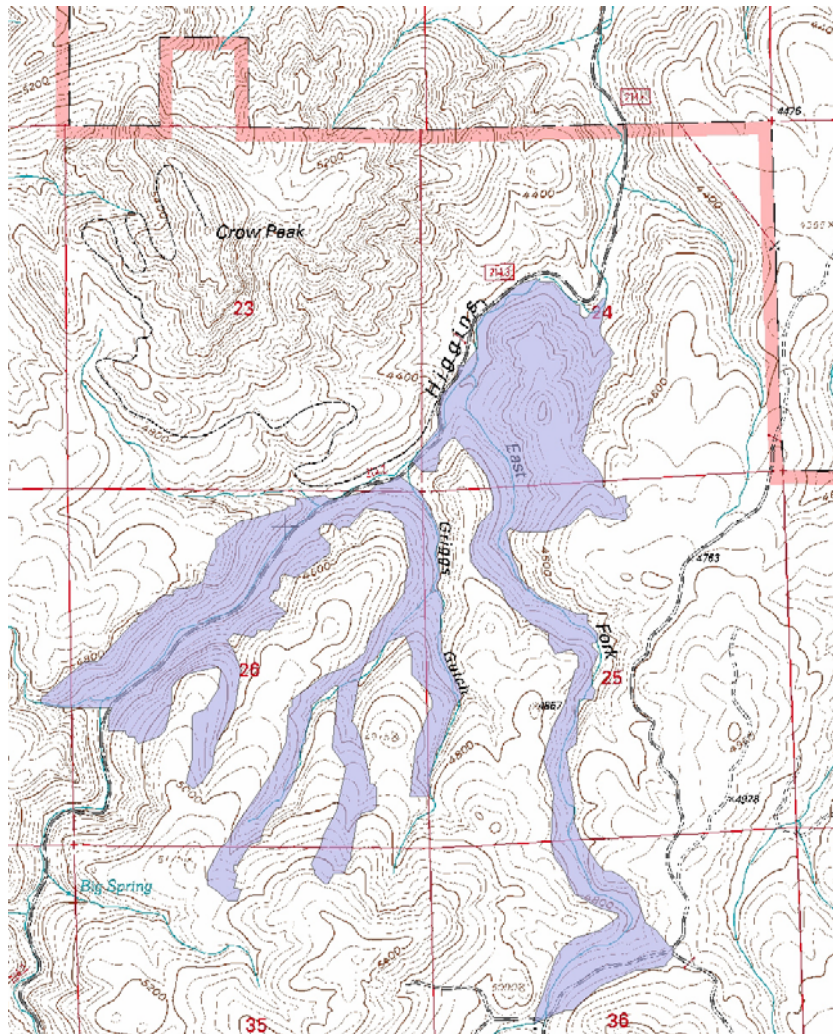
Map 1: General location of Higgins Gulch Floristic Inventory.

The site is located approximately 4.5–6.5 miles southwest of Spearfish, South Dakota.



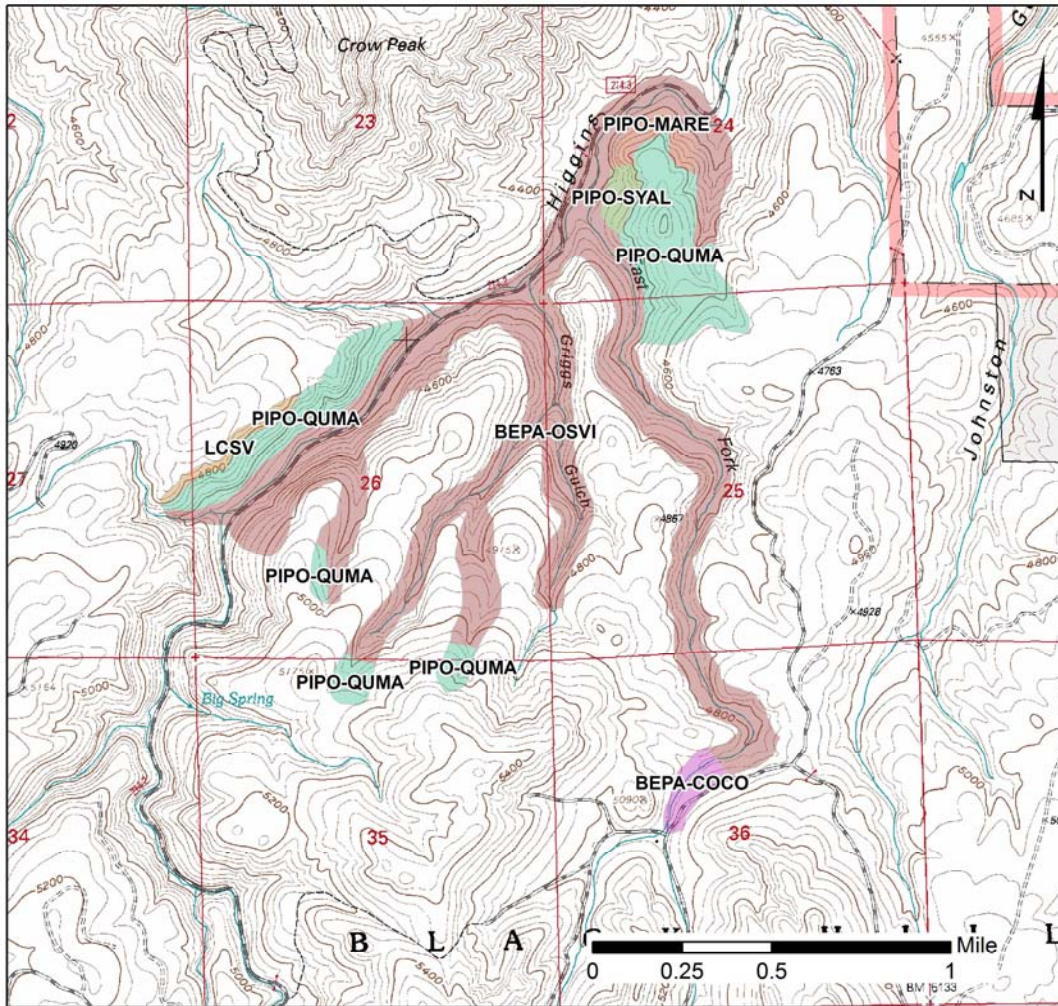
Map 2: Detailed location of Higgins Gulch Floristic Inventory.

The site is located in northern portion of the Black Hills, on the low hills south of Interstate 90.



Map 3: Higgins Gulch Habitats.

Several vegetation types are present within the Higgins Gulch survey area and these habitats are displayed below. Vegetation types follow Marriott and Faber-Langedoen 2000.



Black Hills Vegetation Classification

- | | |
|---|---|
| <i>Betula papyrifera</i> - <i>Corylus cornuta</i> | <i>Pinus ponderosa</i> - <i>Quercus macrocarpa</i> |
| Survey area fera - <i>Ostrya virginiana</i> | <i>Pinus ponderosa</i> - <i>Schizachyrium scoparium</i> |
| <i>Crataegus macrantha</i> shrubland | <i>Pinus ponderosa</i> - <i>Shepherdia canadensis</i> |
| Dry herbaceous vegetation | <i>Pinus ponderosa</i> - <i>Symphoricarpos albus</i> |
| Limestone cliff sparse vegetation | <i>Ponderosa ponderosa</i> - <i>Mahonia repens</i> |
| <i>Picea glauca</i> - <i>Linnea borealis</i> | <i>Populus tremuloides</i> - <i>Picea glauca</i> |
| <i>Pinus ponderosa</i> - <i>Arctostaphylos usa-urvi</i> | <i>Populus tremuloides</i> - <i>Spirea betulifolia</i> |
| <i>Pinus ponderosa</i> - <i>Arctostaphylos uva-ursi</i> | <i>Quercus macrocarpa</i> - <i>Ostrya virginiana</i> |
| <i>Pinus ponderosa</i> - <i>Juniperus communis</i> | Riparian herbaceous vegetation |
| <i>Pinus ponderosa</i> - <i>Mahonia repens</i> | |

Site Description

The Higgins Gulch floristic inventory was located in the northwestern portion of the Black Hills on the low hills south of Interstate 90. Three stream systems were present: Higgins Gulch, the East Fork of Higgins Gulch, and Griggs Gulch. Griggs Gulch and the East Fork of Higgins Gulch drain into Higgins Gulch which flows north, eventually flowing into Spearfish Creek. Limestone outcrops are located on the western and northern edges of the site. Although the aspect was variable, north and east aspects were most common. Slopes ranged from nearly flat (0–5%) to very steep (70%) or vertical. Elevations ranged from approximately 4,180–5,200 feet.

Several vegetation types (Marriott and Faber-Langedoen 2000) are present, including:

- paper birch / ironwood (*Betula papyrifera* / *Ostrya virginiana*)
- paper birch / hazelnut (*Betula papyrifera* / *Corylus cornuta*)
- bur oak / ironwood (*Quercus macrocarpa* / *Ostrya virginiana*)
- ponderosa pine / bur oak (*Pinus ponderosa* / *Quercus macrocarpa*)
- ponderosa pine / Oregon grape (*Pinus ponderosa* / *Mahonia repens*)
- ponderosa pine / kinnikinnik (*Pinus ponderosa* / *Arctostaphylos uva-ursi*)
- limestone rock outcrop sparse vegetation
- disturbed ground dominated by non-native forbs

Ponderosa pine vegetation types were dominant on dry slopes while paper birch, ironwood, hazelnut, and bur oak habitat types dominated the riparian bottoms.

Management Issues

Several management issues are apparent in Higgins Gulch. These include livestock grazing, invasive species, and recreation. Cattle grazing was noted within the boundaries of the site, primarily in Higgins Gulch. Little grazing was noted outside the bottom of Higgins Gulch, but livestock were pushing up both Griggs Gulch and the East Fork of Higgins Gulch. This is likely to impact *Equisetum scirpoides* populations along Higgins Gulch and in the mouths of Griggs Gulch and the East Fork of Higgins Gulch. Although cattle are unlikely to graze on *Equisetum scirpoides* due to its stature and unpalatability, plants are likely to be trampled as cattle access Higgins Gulch and loiter in the riparian zone. Trampling of *Equisetum scirpoides* was noted late in the season. Several invasive plant species were documented and these plants may spread due to the presence of livestock and the road corridor located in Higgins Gulch. Forest Road 214 passes through the site, and many vehicles travel the road each day. Little recreation takes place within the site, although the Crow Peak trailhead immediately adjacent to the site attracts numerous hikers. Vehicles on Forest Road 214 raise large dust clouds, and a layer of dust is evident on the vegetation in Higgins Gulch.

Methods

The Higgins Gulch floristic inventory had a dual purpose; to collect a voucher for every plant species present at the site, and to document all populations of target species (see Appendix 1 for lists of target species). To address these dual goals two separate methodologies were used. To document all populations of target species Forest Service guidelines (Forest Service 2005a and 2005b) were followed for rare plant survey. A meandering transect within the polygons was designed to locate species of concern within the survey area. Plants were identified to species and compared to lists of target species. This technique leads to a relatively complete survey of the area.

Four separate collection trips were made starting in June and ending in September. Multiple visits to the site were made in an attempt to capture all plant species, including both early- and late-blooming species. Vouchers were collected and processed following the methodology of Hartman and Nelson (2008). At each collection site, samples of all vascular plants in flower or fruit not previously collected were obtained. An occasional vegetative collection was included for taxa readily identified in sterile condition (e.g., *Populus*). Roots and perennating organs of herbaceous plants were acquired whenever practical. Collection sites were distributed throughout the area, and each vegetation type was sampled numerous times over the range of elevation. Plant material was placed in plastic bags to prevent wilting and transported on ice in coolers. Specimens were pressed in newspapers following standard procedures and dried for 36-48 hours. Relevant location and ecological data were recorded.

Specimens were identified at the Rocky Mountain Herbarium (RM) using appropriate floras (Dorn 2001, Great Plains Flora Association 1986, Isely 1998, Rollins 1992, Van Bruggen 1985, and all relevant published volumes of the Flora of North America). Nomenclature follows the Rocky Mountain Herbarium Synonymized Checklist of Vascular Plants (2009). Labels were produced using a Microsoft Word form provided by the Black Hills National Forest.

Field Reconnaissance

Field surveys and collections were performed by Brian Elliott, Emily Elliott, and Scott Smith. Scott Smith focused on taxonomic groups he is expert in, particularly the moonworts, ferns, and orchids. Due to the size and terrain at Higgins Gulch, two to three field days were required during each visit to adequately survey the area. Collection dates are summarized below:

Brian Elliott: June 8, 9, 10; July 24, 25, 26; September 4, 5.

Emily Elliott: June 8, 9.

Scott Smith: August 4,5.

Results

Eighty nine populations of fifteen different target species were documented during the course of the inventory. These species are listed in Table 1, below.

Table 1: Target Rare Plant Species

Scientific Name	Common Name	Status* SD/WY	# of Sites
<i>Adenocaulon bicolor</i>	American trailplant	/S2	12
<i>Botrychium virginianum</i>	rattlesnake fern	SR/S2	11
<i>Ceanothus herbaceus</i>	Jersey tea	/S1	3
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	broadleaf enchanter's nightshade	SR/S1	2
<i>Corallorhiza trifida</i>	pale coralroot	S2/S3	1
<i>Cypripedium parviflorum</i>	lesser ladies yellow slipper	SR/SR	2
<i>Dryopteris filix-mas</i>	male fern	S4/S2	3
<i>Equisetum scirpoides</i>	dwarf scouring rush	S2/S1	14
<i>Lactuca canadensis</i>	Canada lettuce	/S1	3
<i>Lycopodium dendroideum</i>	prickly club moss	S4/S1S2	11
<i>Pellaea gastonyi</i>	Gastony's cliffbrake	NRUR/S1	2
<i>Polystichum lonchitis</i>	northern holly fern	S1/S2	13
<i>Prenanthes racemosa</i>	purple rattlesnakeroot	NRUR/S1	3
<i>Prosartes hookeri</i>	fairybells	/S1	5
<i>Viburnum opulus</i> var. <i>americana</i>	American cranberry bush	R2 sensitive	4

*Status codes include:

State Conservation Status (NatureServe):

SX: Presumed Extirpated

SH: Possibly Extirpated

S1: Critically Imperiled

S2: Imperiled

S3: Vulnerable

S4: Apparently Secure

NRUR: Not Ranked Under Review

Seven species of noxious weeds were located during the inventory, including:

<i>Carduus nutans</i>	musk thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Cynoglossum officinale</i>	houndstongue
<i>Hypericum perforatum</i>	St. John's wort
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Potentilla recta</i>	sulfur cinquefoil;
<i>Tanacetum vulgare</i>	common tansy

Floristic Summary and Comparison

A floristic summary is displayed in Table 2. The results of this inventory are compared to the entire flora of the Black Hills as documented in Dorn (1977). This comparison is not ideal, as the floristic summary from Dorn's Black Hills flora is dated.

Table 2: Floristic Summary and Comparison

Attribute	HGFI-Elliott ¹	FBH-Dorn ²	% of Dorn ³
Collections	422	not applicable	not applicable
Gymnosperms	5	7	71.4
Ferns & Fern Allies	15	42	35.7
Angiosperms	228	1211	18.8
Families	61	102	59.8
Genera	175	479	36.5
Species ⁴	190	not reported	not applicable
Infraspecific Taxa	60	not reported	not applicable
Total Taxa	250	1260	19.8
Species of Concern	17	not reported	not applicable
Noxious Weeds	7	not reported	not applicable

1: Higgins Gulch Floristic Inventory, Brian Elliott, 2010

2: Flora of the Black Hills, Dorn, 1977

3: Percentage of the number in Dorn documented in this study.

4: Species are plants without a variety or subspecies (e.g. *Acer glabrum*) while infraspecific taxa are those with a variety or subspecies (e.g. *Acer negundo* var. *interius*). The total number of taxa is the sum of species and infraspecific taxa.

Species List

This study was documented through the collection of 422 vouchers. The species list from those collections is displayed below.

Gymnosperms

Family	Species	Collection numbers
Cupressaceae	<i>Juniperus communis</i> var. <i>depressa</i>	15199
Cupressaceae	<i>Juniperus horizontalis</i>	15858
Cupressaceae	<i>Juniperus scopulorum</i>	15824
Pinaceae	<i>Picea glauca</i>	15088
Pinaceae	<i>Pinus ponderosa</i>	15218

Ferns and Fern Allies

Family	Species	Collection numbers
Dryopteridaceae	<i>Cystopteris fragilis</i>	15075, 15134, 15173, 15834, 15870
Dryopteridaceae	<i>Dryopteris filix-mas</i>	ss204, ss205, 15132
Dryopteridaceae	<i>Polystichum lonchitis</i>	ss194, 15104, 15130, 15844, 15900, 16078
Dryopteridaceae	<i>Woodsia oregana</i> var. <i>oregana</i>	ss201

Family	Species	Collection numbers
Equisetaceae	<i>Equisetum arvense</i>	15069, 15131, 15904
Equisetaceae	<i>Equisetum hyemale</i>	15119
Equisetaceae	<i>Equisetum laevigatum</i>	15256
Equisetaceae	<i>Equisetum pratense</i>	ss207
Equisetaceae	<i>Equisetum scirpoides</i>	ss206, 15895, 16062
Lycopodiaceae	<i>Lycopodium dendroideum</i>	ss203, ss202, 15105, 15179, 15180, 15871, 16076
Ophioglossaceae	<i>Botrychium virginianum</i>	15085, 15133
Pteridaceae	<i>Cheilanthes feei</i>	15185
Pteridaceae	<i>Pellaea atropurpurea</i>	15226
Pteridaceae	<i>Pellaea gastonyi</i>	15212, 15268, 15818, 15819, 15859
Pteridaceae	<i>Pellaea glabella</i> ssp. <i>occidentalis</i>	15258
Pteridaceae	<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	15092, 15172, 15832
Selaginellaceae	<i>Selaginella densa</i>	ss198

Flowering Plants (Monocots and Dicots)

Family	Species	Collection numbers
Aceraceae	<i>Acer negundo</i> var. <i>interius</i>	15854, 15912
Anacardiaceae	<i>Rhus trilobata</i> var. <i>trilobata</i>	15231
Anacardiaceae	<i>Toxicodendron rydbergii</i>	15826, 16075
Apiaceae	<i>Apocynum androsaemifolium</i>	15795
Apiaceae	<i>Cicuta maculata</i> var. <i>angustifolia</i>	16074
Apiaceae	<i>Daucus carota</i>	16040
Apiaceae	<i>Heracleum maximum</i>	15114
Apiaceae	<i>Musineon tenuifolium</i>	15209, 15227
Apiaceae	<i>Osmorhiza depauperata</i>	15084, 15245
Apiaceae	<i>Zizia aptera</i>	15183
Araliaceae	<i>Aralia nudicaulis</i>	15107, 15135
Asclepiadaceae	<i>Asclepias ovalifolia</i>	15848, 15894
Asclepiadaceae	<i>Asclepias viridiflora</i>	15820
Asteraceae	<i>Achillea millefolia</i>	15794
Asteraceae	<i>Adenocaulon bicolor</i>	15113, 15275, 15837, 15909, 16080
Asteraceae	<i>Antennaria howellii</i>	15145, 15193, 15221, 15248
Asteraceae	<i>Arnica cordifolia</i>	15111, 15126, 15150
Asteraceae	<i>Carduus nutans</i>	15780
Asteraceae	<i>Cirsium flodmanii</i>	15773, 15823
Asteraceae	<i>Cirsium vulgare</i>	16042
Asteraceae	<i>Erigeron annuus</i>	16072
Asteraceae	<i>Erigeron subtrinervis</i>	15798
Asteraceae	<i>Eurybia conspicua</i>	15863

Family	Species	Collection numbers
Asteraceae	<i>Eutrochium maculatum</i> var. <i>bruneri</i>	15061
Asteraceae	<i>Heterotheca villosa</i> var. <i>minor</i>	15825
Asteraceae	<i>Hieracium albiflorum</i>	15862, 15872
Asteraceae	<i>Hieracium umbellatum</i>	15838
Asteraceae	<i>Lactuca biennis</i>	15856, 15885, 15910
Asteraceae	<i>Lactuca canadensis</i>	15788, 15908, 16052
Asteraceae	<i>Leucanthemum vulgare</i>	15772
Asteraceae	<i>Liatris punctata</i> var. <i>punctata</i>	16057
Asteraceae	<i>Matricaria discoidea</i>	15881, 16041
Asteraceae	<i>Prenanthes racemosa</i> var. <i>multiflora</i>	16069
Asteraceae	<i>Rudbeckia hirta</i> var. <i>pulcherrima</i>	15789, 15802, 16033
Asteraceae	<i>Rudbeckia laciniata</i> var. <i>ampla</i>	15842, 16068
Asteraceae	<i>Solidago missouriensis</i>	15793
Asteraceae	<i>Solidago speciosa</i> var. <i>pallida</i>	16046
Asteraceae	<i>Symphytrichum ciliolatum</i>	16045
Asteraceae	<i>Tanacetum vulgare</i>	15197, 16029
Asteraceae	<i>Taraxacum officinale</i>	15198
Berberidaceae	<i>Berberis repens</i>	15083, 15158
Betulaceae	<i>Betula papyrifera</i>	15093, 15140, 15195
Betulaceae	<i>Corylus cornuta</i>	15122, 15184
Betulaceae	<i>Ostrya virginiana</i>	15094, 15147, 16030
Boraginaceae	<i>Cynoglossum officinale</i>	15251, 15778
Brassicaceae	<i>Arabis divaricarpa</i>	15270
Brassicaceae	<i>Arabis glabra</i>	15255
Brassicaceae	<i>Arabis hirsuta</i> var. <i>glabrata</i>	15807
Brassicaceae	<i>Arabis hirsuta</i> var. <i>pycnocarpa</i>	15232, 15264
Brassicaceae	<i>Barbarea vulgaris</i>	15816, 15254
Brassicaceae	<i>Capsella bursa-pastoris</i>	15879
Brassicaceae	<i>Descurainia incana</i> var. <i>incana</i>	15266A
Brassicaceae	<i>Erysimum asperum</i>	15230
Brassicaceae	<i>Sisymbrium loeselii</i>	15769
Brassicaceae	<i>Thlaspi arvense</i>	15876
Campanulaceae	<i>Campanula rotundifolia</i>	15790
Caprifoliaceae	<i>Linnaea borealis</i> var. <i>longiflora</i>	15082, 15207
Caprifoliaceae	<i>Lonicera dioica</i> var. <i>glaucescens</i>	15861, 16066
Caprifoliaceae	<i>Sambucus racemosa</i> var. <i>melanocarpa</i>	14814, 15072, 15178
Caprifoliaceae	<i>Symphoricarpos albus</i> var. <i>albus</i>	15228
Caprifoliaceae	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	16067
Caprifoliaceae	<i>Symphoricarpos occidentalis</i>	15814
Caprifoliaceae	<i>Viburnum opulus</i> var. <i>americanum</i>	15205, 16025
Caryophyllaceae	<i>Cerastium arvense</i>	15154
Caryophyllaceae	<i>Cerastium fontanum</i>	15191

Family	Species	Collection numbers
Caryophyllaceae	<i>Moehringia lateriflora</i>	15081, 15168
Caryophyllaceae	<i>Paronychia depressa</i>	15821
Caryophyllaceae	<i>Silene latifolia</i>	15809
Clusiaceae	<i>Hypericum perforatum</i>	15770, 16027
Convolvulaceae	<i>Convolvulus arvensis</i>	15765
Cornaceae	<i>Cornus canadensis</i>	15090, 15166, 16077
Cornaceae	<i>Cornus sericea</i> var. <i>sericea</i>	15905
Crassulaceae	<i>Sedum lanceolatum</i>	15860
Cyperaceae	<i>Carex aurea</i>	15239
Cyperaceae	<i>Carex blanda</i>	15238, 15889, 15892
Cyperaceae	<i>Carex deweyana</i> var. <i>deweyana</i>	15080
Cyperaceae	<i>Carex disperma</i>	15845, 15899
Cyperaceae	<i>Carex duriuscula</i>	15237
Cyperaceae	<i>Carex foenea</i>	15192, 15247, 15855
Cyperaceae	<i>Carex haydeniana</i>	15234
Cyperaceae	<i>Carex peckii</i>	15169, 15186, 15244
Cyperaceae	<i>Carex richardsonii</i>	15210, 15263
Cyperaceae	<i>Carex rossii</i>	15262
Cyperaceae	<i>Carex saximontana</i>	15229
Cyperaceae	<i>Carex sprengelii</i>	15087, 15250
Cyperaceae	<i>Carex utriculata</i>	15118
Cyperaceae	<i>Schoenoplectus acutus</i> var. <i>acutus</i>	15914
Cyperaceae	<i>Scirpus microcarpus</i>	15913
Elaeagnaceae	<i>Shepherdia canadensis</i>	15196
Ericaceae	<i>Arctostaphylos uva-ursi</i> var. <i>adenotricha</i>	15164, 15202, 16056
Ericaceae	<i>Chimaphila umbellata</i> var. <i>occidentalis</i>	15099
Ericaceae	<i>Orthilia secunda</i>	15830
Ericaceae	<i>Pterospora andromedea</i>	15801, 16036
Ericaceae	<i>Pyrola asarifolia</i>	15208
Ericaceae	<i>Pyrola chlorantha</i>	15100
Ericaceae	<i>Pyrola elliptica</i>	15867
Euphorbiaceae	<i>Euphorbia brachycera</i> var. <i>robusta</i>	15267
Fabaceae	<i>Amorpha canescens</i>	15849
Fabaceae	<i>Astragalus australis</i> var. <i>glabriusculus</i>	15217
Fabaceae	<i>Astragalus crassicaarpus</i> var. <i>crassicaarpus</i>	15216, 15803
Fabaceae	<i>Dalea candida</i> var. <i>oligophylla</i>	15799
Fabaceae	<i>Glycyrrhiza lepidota</i> var. <i>lepidota</i>	15804
Fabaceae	<i>Lathyrus ochroleucus</i>	15127, 15159
Fabaceae	<i>Lupinus argenteus</i> var. <i>rubricaulis</i>	15182, 15252
Fabaceae	<i>Medicago lupulina</i>	15194, 15810, 15831, 15874
Fabaceae	<i>Medicago sativa</i>	15764
Fabaceae	<i>Melilotus officinalis</i>	15771

Family	Species	Collection numbers
Fabaceae	<i>Pedimelum argophyllum</i>	15800
Fabaceae	<i>Trifolium hybridum</i>	15813
Fabaceae	<i>Trifolium pratense</i>	15786
Fabaceae	<i>Vicia americana</i> var. <i>americana</i>	15224, 15242
Fagaceae	<i>Quercus macrocarpa</i>	15074, 15139, 15200, 15850
Geraniaceae	<i>Geranium carolinianum</i>	15877
Geraniaceae	<i>Geranium richardsonii</i>	15086, 15109, 15240
Grossulariaceae	<i>Ribes americanum</i>	15124
Grossulariaceae	<i>Ribes lacustre</i>	15123
Hydrophyllaceae	<i>Phacelia linearis</i>	15273
Iridaceae	<i>Sisyrinchium montanum</i>	15153
Juncaceae	<i>Juncus balticus</i> var. <i>vallicola</i>	15235
Juncaceae	<i>Juncus dudleyi</i>	15891
Lamiaceae	<i>Agastache foeniculum</i>	15839, 15843
Lamiaceae	<i>Hedeoma hispidum</i>	15827
Lamiaceae	<i>Mentha arvensis</i>	15898, 16031
Lamiaceae	<i>Monarda fistulosa</i> var. <i>menthifolia</i>	15796, 15836, 16026
Lamiaceae	<i>Prunella vulgaris</i>	15783
Liliaceae	<i>Lilium philadelphicum</i> var. <i>andinum</i>	15095
Liliaceae	<i>Maianthemum canadense</i> var. <i>interius</i>	15249
Liliaceae	<i>Maianthemum stellatum</i>	15076, 15141
Liliaceae	<i>Prosartes hookeri</i>	15110, 15128, 15167, 15857, 15907, 16050, 16064, 16079
Liliaceae	<i>Prosartes trachycarpa</i>	15171, 16049, 16065
Liliaceae	<i>Smilax herbacea</i>	15261
Liliaceae	<i>Yucca glauca</i>	15822
Liliaceae	<i>Zigadenus venenosus</i> var. <i>gramineus</i>	15259
Malvaceae	<i>Malva neglecta</i>	15875
Onagraceae	<i>Circaea alpina</i> var. <i>alpina</i>	15868, 15886, 16063
Onagraceae	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	16051
Onagraceae	<i>Epilobium ciliatum</i> var. <i>ciliatum</i>	15817, 15901, 16035
Onagraceae	<i>Oenothera biennis</i>	15767
Orchidaceae	<i>Corallorhiza maculata</i>	15103
Orchidaceae	<i>Corallorhiza striata</i>	15101
Orchidaceae	<i>Corallorhiza wisteriana</i>	15102, 15129, 15163
Orchidaceae	<i>Cypripedium parviflorum</i>	ss197, 15884
Orchidaceae	<i>Goodyera oblongifolia</i>	15096, 15864
Orchidaceae	<i>Piperia unalascensis</i>	15782
Orchidaceae	<i>Platanthera aquilonius</i>	15903
Plantaginaceae	<i>Plantago major</i>	15776
Poaceae	<i>Agrostis stolonifera</i>	15785, 16034
Poaceae	<i>Andropogon gerardii</i>	16058

Family	Species	Collection numbers
Poaceae	<i>Bromus inermis</i>	15774
Poaceae	<i>Bromus porteri</i>	15851
Poaceae	<i>Bromus pubescens</i>	16071
Poaceae	<i>Bromus tectorum</i>	15272
Poaceae	<i>Dactylis glomerata</i>	15253, 15775
Poaceae	<i>Danthonia spicata</i>	15852, 15865
Poaceae	<i>Dichanthelium leibergii</i>	15792
Poaceae	<i>Elymus canadensis</i> var. <i>canadensis</i>	15805
Poaceae	<i>Elymus canadensis</i> var. <i>hirsutus</i>	15893
Poaceae	<i>Elymus hispidus</i> var. <i>hispidus</i>	15777
Poaceae	<i>Elymus trachycaulus</i>	15866
Poaceae	<i>Glyceria striata</i>	15873
Poaceae	<i>Lolium multiflorum</i>	16037
Poaceae	<i>Oryzopsis asperifolia</i>	15073, 15161, 15203
Poaceae	<i>Phleum pratense</i>	15811
Poaceae	<i>Piptatherum micranthum</i>	15828, 15911
Poaceae	<i>Poa annua</i>	15878
Poaceae	<i>Poa arida</i>	15233
Poaceae	<i>Poa compressa</i>	15265
Poaceae	<i>Poa pratensis</i>	16070
Poaceae	<i>Schizachyrium scoparium</i>	16059
Poaceae	<i>Sorghastrum nutans</i>	16060
Polemoniaceae	<i>Collomia linearis</i>	15260
Polygalaceae	<i>Polygala senega</i>	15781
Polygonaceae	<i>Polygonum aviculare</i>	15882, 15883
Portulacaceae	<i>Claytonia rubra</i>	15222
Primulaceae	<i>Primula pauciflora</i> var. <i>pauciflora</i>	15117, 15177
Ranunculaceae	<i>Actaea rubra</i>	15071
Ranunculaceae	<i>Anemone multifida</i>	15215
Ranunculaceae	<i>Anemone patens</i>	15213
Ranunculaceae	<i>Clematis columbiana</i> var. <i>tenuiloba</i>	15271
Ranunculaceae	<i>Delphinium bicolor</i>	15097, 15157
Ranunculaceae	<i>Ranunculus abortivus</i>	15246
Ranunculaceae	<i>Thalictrum dasycarpum</i>	15869
Rhamnaceae	<i>Ceanothus herbaceus</i>	15225, 15847, 16055
Rhamnaceae	<i>Ceanothus velutinus</i>	15160
Rosaceae	<i>Agrimonia gryposepala</i>	15787
Rosaceae	<i>Amelanchier alnifolia</i> var. <i>alnifolia</i>	15098, 15138
Rosaceae	<i>Amelanchier utahensis</i>	15162
Rosaceae	<i>Crataegus macrantha</i> var. <i>occidentalis</i>	15176, 16054
Rosaceae	<i>Fragaria vesca</i>	15089, 15149, 15276, 15890
Rosaceae	<i>Fragaria virginiana</i>	15116, 15181

Family	Species	Collection numbers
Rosaceae	<i>Malus pumila</i>	15152
Rosaceae	<i>Potentilla recta</i>	15815, 16039
Rosaceae	<i>Prunus pensylvanica</i>	15165, 15187, 16032, 16044
Rosaceae	<i>Prunus virginiana</i> var. <i>melanocarpa</i>	15115, 15142
Rosaceae	<i>Rosa acicularis</i> ssp. <i>sayi</i>	15211, 15241
Rosaceae	<i>Rubus idaeus</i> var. <i>aculeatissimum</i>	15846
Rosaceae	<i>Rubus idaeus</i> var. <i>strigosus</i>	15175
Rosaceae	<i>Rubus parviflorus</i>	15112, 15156, 15204
Rosaceae	<i>Rubus pubescens</i>	15077, 15170
Rosaceae	<i>Sorbus scopulina</i>	15108
Rosaceae	<i>Spiraea betulifolia</i> var. <i>lucida</i>	15806
Rubiaceae	<i>Galium boreale</i>	15797
Rubiaceae	<i>Galium triflorum</i>	15833, 16073
Salicaceae	<i>Populus angustifolia</i>	15174
Salicaceae	<i>Populus deltoides</i> var. <i>wislizenii</i>	15137
Salicaceae	<i>Populus tremuloides</i>	15106, 15134, 16047
Salicaceae	<i>Salix bebbiana</i>	15078, 15125, 15136, 15840
Salicaceae	<i>Salix exigua</i> ssp. <i>interior</i>	15896
Salicaceae	<i>Salix scouleriana</i>	15835
Saxifragaceae	<i>Heuchera richardsonii</i>	15269
Scrophulariaceae	<i>Castilleja sulphurea</i>	15144, 15214
Scrophulariaceae	<i>Collinsia parviflora</i>	15223
Scrophulariaceae	<i>Lithophragma parviflora</i>	15151
Scrophulariaceae	<i>Mimulus guttatus</i>	15121, 15906
Scrophulariaceae	<i>Penstemon glaber</i> var. <i>glaber</i>	15766
Scrophulariaceae	<i>Verbascum thapsus</i>	15201, 16043
Scrophulariaceae	<i>Veronica americana</i>	15236
Solanaceae	<i>Solanum rostratum</i>	16048
Ulmaceae	<i>Ulmus americana</i>	15808, 16028
Ulmaceae	<i>Ulmus pumila</i>	15768
Urticaceae	<i>Urtica dioica</i>	15812
Verbenaceae	<i>Verbena bracteata</i>	15880, 16038
Verbenaceae	<i>Verbena stricta</i>	15779
Violaceae	<i>Viola adunca</i>	15146
Violaceae	<i>Viola canadensis</i>	15091, 15155
Violaceae	<i>Viola praemorsa</i> var. <i>altior</i>	15274
Violaceae	<i>Viola pubescens</i>	15120, 15148, 15428
Violaceae	<i>Viola sororia</i> var. <i>affinis</i>	15079
Vitaceae	<i>Vitis riparia</i>	15841

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Appendix 1

Taxa of Concern

The target rare plant species lists were provided by the Black Hills National Forest. Several different lists were required due to the proximity of the state border. This list reflects revisions of 7-29-2009.

R2 Sensitive Species Relevant to BHNF

Botrychium campestre SDNRUR;WYS1
Botrychium lineare (candidate T&E species) ◆
SDNR;WYNR
Carex alopecoidea SDS2;WYS1
Cypripedium parviflorum SDNRUR;WYNRUR
Eleocharis elliptica WYSNR/SU
Epipactis gigantea SDS1;WYS1
Lycopodium complanatum SDS1;WYS1
Platanthera orbiculata SDS2;WYS1
Salix candida SDS1;WYS2
Salix serissima SDS1;WYS1
Sanguinaria canadensis SDS4;WYNR
Viburnum opulus var. *americana* SDNRUR;WYS1
Viola selkirkii SDS1;WYNR

Species of Local Concern

Adiantum capillus-veneris SDS1;WYNR
Botrychium multifidum SDNRUR;WYS2
Carex bella SDS1;WYNR
Eleocharis rostellata SDS1;WYS2
Gentiana affinis SDS2;WYS4
Listera convallarioides SDS1;WYS1
Lycopodium annotinum SDS1;WYS2
Oxyria digyna SDS1;WY
Petasites sagittatus SDS1;WYS2
Polystichum lonchitis SDS1;WYS2
Salix lucida SDS1;WYNRUR

Insufficient Information (may also be SD/WY tracked)

Adiantum pedatum SDSH;WYNR
Apios americana SDNRUR; WY
Arenaria (Eremogone) hookeri ssp. *pinetorum*
SDNRUR;WYS2S3
Astragalus hyalinus SDNRUR;WYS3
Astragalus miser var. *decumbens* SDSH;WY
Bacopa rotundifolia SDNRUR;WYS1
Botrychium lanceolatum SD;WYS1
Botrychium lunaria SDSH;WYS2
Botrychium matricariifolium SDNRUR;WY
Botrychium michiganense SD;WY
Botrychium simplex SDNRUR;WYS2
Botrychium virginianum SDNRUR; WYS2
(please note if next to old road)
Campanula aparinoides SDNRUR;WYS1
Carex athrostachya SDNRUR;WYS3
Carex concinna SDS3;WYS1
Carex granularis var. *haleana* SDNRUR;WYS1
Carex occidentalis SDNRUR;WYS1
Carex rosea SDNRUR;WYS1
Carex rupestris SDNRUR;WYS2

Carex tribuloides SDNRUR;WY
Carex viridula SDS1;WYS1S2
Centunculus (Anagallis) minimus SDNRUR;WYS1
Circaea lutetiana var. *canadensis* SDNRUR;WYS1
Corallorrhiza odontorhiza NRUR
Corallorrhiza trifida SDS2;WYS3
Cryptantha cana SDS2;WYS3
Cryptogramma acrostichoides SDNRUR;WYS3
Danthonia californica SDNRUR;WYS2
Dicanthelium linearifolium SD;WYS1
Disporum (Prosartes) hookeri SD;WYS1
Elaeagnus commutata SDNRUR;WYS3
Eleocharis ovata SDNRUR;WYS1
Elymus diversiglumis SDNRUR; WYS2
Elymus villosus SD;WYS1
Equisetum variegatum SDS1;WYS2S3
Erigeron acris SDSH;WYNRUR
Eustoma grandiflorum SDS1;WYS1
(*E. exaltatum* var. *russellianum*)
Gentiana puberulenta SDS4?;WY
Habenaria (Platanthera) dilatata SDNRUR;WY
Lechea intermedia SDNRUR;WYS1
Ledum groenlandicum SDSX;WY
Lesquerella arenosa var. *argillosa* SDS3;WYS1
Lithophragma glabrum SDSH;WYNR
Lomatium nuttallii SDSH;WYS3
Luzula acuminata var. *acuminata* SDNRUR;WY
Luzula parviflora SDNRUR;WY
Lycopus uniflorus SDNRUR;WYS1
Menyanthes trifoliata SDS1;WYS2S3
Mitella pentandra SDNRUR;WYS3S4
Moneses uniflora SDNRUR;WYS3
Myosotis verna SDNRUR;WYS1
Orobanche uniflora SDNRUR;WYS2S3
*Pellaea atropurpurea** SDNRUR;*WYS1?
Pellaea gastonyi *SDNRUR;*WYS1
Pellaea suksdorfiana(*P. glabella* var. *simplex*) *SD;*WYS1
NOTE: please collect several *Pellaea* sp. specimens per project area—taxonomic issues
Physalis (Leucophysalis) grandiflora SDSX;WY
Poa rupicola (*Poa glauca* var. *rupicola*) SDNRUR;WYS3S4
Polygala verticillata SDNRUR;WYS1
Polystichum munitum SDSH;WY
Potamogeton diversifolius SDNRUR;WYS1
Prenanthes racemosa var. *multiflora* SDNRUR;WYS1
Rhamnus alnifolia SDSH;WYS2
Selaginella rupestris SDNRUR;WYS1
Sparganium eurycarpum SDNRUR;WYS1
Vaccinium membranaceum SDS2;WYS2
Viburnum edule SDS3;WYS1

Other SD Species

Adoxa moschatellina S3
Allium drummondii NRUR
Agoseris aurantiaca NRUR
Aquilegia brevistyla *NRUR
Asplenium trichomanes S3

Asplenium trichomanes-ramosum S2
Aster pauciflorus SH
Astragalus americanus S3
Bupleurum americanum SDNRUR, WYNRUR
Calyso bulbosa S3
Carex brunnescens NRUR
Carex canescens S2
Carex capillaris S3
Carex leptalea *S2
Ceanothus fendleri S2
Chaenactis douglasii NRUR
Chenopodium subglabrum NRUR
Chrysothamnus parryi S4?
Cinna arundinacea SH
Clematis hirsutissima NRUR
Cryptantha jamesii SH
Deschampsia cespitosa S3
Dryopteris carthusiana NRUR
Echinocereus viridiflorus S3
Equisetum scirpoides S2
Equisetum sylvaticum NRUR
Eragrostis trichodes S4
Eriophorum polystachion S3
Euphorbia fendleri NRUR
Gymnocarpium dryopteris NRUR
Haplopappus multicaulis NRUR
Ipomopsis spicata S4?
Isopyrum biternatum SH
Juncus alpinus S3
Juncus articulatus NRUR
Lesquerella montana NRUR
Lithophragma glabrum SH
Lithospermum carolinense S4?
Lobelia kalmii S1
Lycopodium dendroideum *S4
Mertensia ciliata S1
Microseris nutans SH
Monarda pectinata SH
*Muhlenbergia glomerata** NRUR
Navarretia intertexta var. *propinqua* SH
Oenothera flava NRUR
Parnassia palustris SDS1
Pedicularis procera S2
Penstemon nitidus NRUR
Petrophyton caespitosum *S4?
Phacelia linearis NRUR
Phleum alpinum NRUR
Picradeniopsis woodhousei NRUR
Pinus contorta var. *latifolia* SDS2;WY
Pinus flexilis SDS1;WY
Polygala sanguinea NRUR
Potamogeton vaginatus S2
Prenanthes aspera NRUR
Psoralea linearifolia NRUR
Pyrola picta S2
Saxifraga cernua NRUR
Saxifraga occidentalis S2
Scirpus atrocinctus/cyperinus *S4; collect voucher
Scrophularia marilandica NRUR
Senecio spartioides NRUR
Solidago sparsiflora NRUR
Sparganium chlorocarpum NRUR
Spiraea alba S3
Stipa robusta NRUR
Thelesperma megapotamicum NRUR
Thelypteris palustris S2
Townsendia exscapa S4?
Townsendia grandiflora S4?
Townsendia hookeri NRUR
Triplasis purpurea NRUR

Tripterocalyx micranthus SH
Xylorhiza glabriuscula S4?

Other WY Species

*Adenocaulon bicolor** S2
Adoxa moschatellina S1
Aquilegia brevistyla S1
Astragalus americanus S2
Athyrium filix-femina S2
Botrychium pallidum NA
Calystegia macounii S1
Carex leptalea *S2
Carex richardsonii S1
Ceanothus herbaceus S1
Chenopodium strictum S1
Circaea lutetiana var. *canadensis* S1
Corydalis aurea var. *occidentale* S1
Dicanthelium wilcoxianum S1S2
Dryopteris filix-mas *S2
Equisetum scirpoides S1
Equisetum sylvaticum S1
Erigeron glabellus var. *pubescens* S1
Euphorbia marginata S1
Gymnocarpium dryopteris S1
Helianthemum bicknellii S1
Helianthus tuberosus var. *subcanescens* S1
Hieracium fendleri S1
Hymenopappus tenuifolius SH
Lactuca canadensis S1
Lactuca ludoviciana S1S2
Leersia oryzoides S1S2
Lycopodium dendroideum S1S2
Muhlenbergia glomerata S2
Muhlenbergia mexicana S1?
Onoclea sensibilis S1
Physalis virginiana var. *virginiana* S1
Piptatherum pungens S2
Polygonum bicorne S1
Polygonum scandens S1
Scirpus atrocinctus/cyperinus *S2; collect voucher
Sorghastrum nutans S1
Sparganium eurycarpum S1
Sporobolus heterolepis S1
Symphotrichum novae-angiae S1
Tradescantia bracteata S1
Triodanis leptocarpa S1
Viola pedatifida S1
Viola renifolia var. *brainerdii* S1

Other Species of Interest

Anagallis minima SDNRUR;WYS1
Botrychium gallicomontanum NA
Botrychium minganense SD;WYS1
Calochortus apiculatus NA
Cynoglossum boreale *SDNRUR;WYS2
Erigeron acris SDSH;WYNRUR
Froelichia gracilis SDNRUR;WYSH
Geum rivale SDNRUR;WYS1
Hierochloa odorata NA
Juncus nevadensis var. *badius* SD;WYS2
Lewisia pygmaea SDSNR/SU; WYS4
Lycopus uniflorus SDNRUR;WYS1
Mimulus floribundus SDSH;WYS2
Phryma leptostachya SD;WYS1
Polygonatum biflorum SDNRUR;WYS1
Sanicula graveolens SDNA; WYS2
Sedum integrifolium SD;WYS3

Spiranthes diluvialis T&E; SD;WYS1
Symphotrichum boreale SDS3;WYS2

S2: Imperiled
 S3: Vulnerable
 S4: Apparently Secure
 NRUR: Not Ranked Under Review (may or may not be rare)

State Conservation Status (NatureServe):

SX: Presumed Extirpated
 SH: Possibly Extirpated
 S1: Critically Imperiled

NA- Not Applicable: Not reported/present in that state;
 no rank in NatureServe

Noxious Weeds

The following plant species are considered noxious weeds by the Black Hills National Forest.

Code	Scientific Name	Common Name
ELRER	<i>Agropyron repens</i>	Quackgrass
ARMI2	<i>Arctium minus</i>	Burdock
BUUM	<i>Butomus umbellatus</i>	Flowering rush
CADR	<i>Cardaria spp.</i>	Whitetop
CAAC	<i>Carduus acanthodes</i>	Plumeless thistle
CANU4	<i>Carduus nutans</i>	Musk thistle
CEDI3	<i>Centaurea diffusa</i>	Diffuse knapweed
CEBI2	<i>Centaurea maculosa</i>	Spotted knapweed
ACRE3	<i>Centaurea repens</i>	Russian knapweed
CESO3	<i>Centaurea solstitialis</i>	Yellow star thistle
LEVU	<i>Chrysanthemum leucanthemum</i>	Oxeye daisy
CIAR	<i>Cirsium arvense</i>	Canada thistle
CIVU	<i>Cirsium vulgare</i>	Bull thistle
COAR4	<i>Convolvulus arvensis</i>	Field Bindweed
CYOF	<i>Cynoglossum officinale</i>	Houndstongue
DIFU2	<i>Dipsacus fullonum</i>	Teasel
EUES	<i>Euphorbia esula</i>	Leafy spurge
FAVU	<i>Falcaria vulgaris</i>	Sickleweed
HYNI	<i>Hyoscyamus niger</i>	Henbane
HYPE	<i>Hypericum perforatum</i>	St. Johnswort
IRPS	<i>Iris pseudacorus</i>	Yellow iris
ISTI	<i>Isatis tinctoria</i>	Dyers woad
KOSC	<i>Kochia scoparia</i>	Kochia
LELA2	<i>Lepidium latifolium</i>	Perennial pepperweed
LIGE	<i>Linaria genistifolia</i>	Dalmation toadflax
LIVU2	<i>Linaria vulgaris</i>	Yellow toadflax
LYSA2	<i>Lythrum salicaria</i>	Purple loosestrife
MYSP2	<i>Myriophyllum spicatum</i>	Eurasian water-milfoil
NAOF	<i>Nasturtium officinale</i>	Water-cress
ONAC	<i>Onopordum acanthium</i>	Scotch thistle
POCR3	<i>Potamogeton crispus</i>	Curly pondweed
PORE5	<i>Potentilla recta</i>	Sulfur cinquefoil
SAKA	<i>Salsola kali</i>	Russian thistle
SOCA3	<i>Solanum carolinense</i>	Horsenettle
SOAR2	<i>Sonchus arvensis</i>	Perennial sowthistle
TARA	<i>Tamarix ramosissima</i>	Salt Cedar
TAVU	<i>Tanacetum vulgare</i>	Common tansy
TRTE	<i>Tribulus terrestris</i>	Puncturevine

