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A SURVEY OF THE VEGETATION
OF JEWEL CAVE NATIONAL MONUMENT

Hollis Marriott
Ronald L. Hartment
Department of Botany
University of Wyoming
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Completion Report
U.W.-N.P.S. Research Center Project

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Hollis Marriott
Ronald L. Hartman
Department of Botany
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Objectives

Jewel Cave National Monument (hence referred to as JECA) occupies 516 ha on the southwestern edge of the Limestone Plateau area of the Black Hills (Custer Co., South Dakota). Underlain by the resistant Pahasapa limestone (Mississippian), it is characterized by steep topography and deep canyons, with elevations ranging from roughly 1550 to 1750 m above sea level. Ponderosa pine forest dominates the landscape. Much of the forest was logged at least once prior to being incorporated into the Monument during a US Forest Service-National Park Service land swap in the early 1960's. Roughly one quarter section (the "old area") was part of the original Monument and has not been logged.

Prior to 1985, studies of the vegetation and flora at JECA were limited to small projects by seasonal staff; this project was carried out to satisfy the need for more thorough baseline information. The primary objectives were two: to compile a flora (a list of vascular plants) of JECA, and to map plant communities present at the time of the study. As well as serving as a baseline for resource management, this information will be useful for above-ground interpretation. Other benefits from the project include an herbarium for the Monument, a wildflower checklist for visitor use, and several specific recommendations for management of the Monument's vegetation and flora.

Methods

The Flora Collecting began in early May and continued through early September, 1985. Specimens were pressed and dried, and habitat information was recorded for each. All specimens were identified at the Rocky Mountain Herbarium, University of Wyoming (hence referred to as the RM). Collection data were entered into a microcomputer database from which checklists and herbarium labels were generated. Specimens were mounted and placed in the Monument herbarium, with duplicates on file at the RM. Specimens collected by previous workers at JECA were examined, and annotated and remounted when necessary.

Abnormally low rainfall hampered floristic work. Normally-common species were rare or absent, and many individuals were dwarfed and did

not flower. However, specimens already in the Monument herbarium (175 taxa) helped compensate for poor collecting conditions.

The Vegetation As a first step in vegetation mapping, vegetation units were delimited on an aerial photograph and modified through ground reconnaissance without sampling. Quantitative analysis was carried out in August. Three stands (when available) of each plant community type were sampled using quadrats located according to a stratified random design. Depending on the size of the stand, 10 to 20 quadrats were sampled. Nested quadrats of 50 sq m, 12.5 sq m, and 200 sq cm were used to sample trees, shrubs and herbs respectively. Circumference at breast height was recorded for trees (at least 40 cm in circumference) and saplings (at least 1 m tall) were counted by species. Cover class was noted for shrub species, and presence/absence was recorded for herbaceous taxa. Cover class was recorded for the entire herbaceous component as well.

Forest communities were characterized using basal area of the tree component, tree density, average DBH, sapling density and dominant shrub/herb associates. Grassland and shrubland communities were classified based on dominant species as determined by frequency of occurrence. Drought conditions had little effect on vegetation sampling due to the predominance of forest/shrub associations in the Monument. Grassland dominants were easily recognized from dead material from the previous year.

An overlay of soil units accompanies the vegetation map (soils information was obtained from the Soil Conservation Service in Custer). No useful information, either written or oral, concerning logging patterns in the Monument was found. Presence/absence of large stumps (from timber harvest) and small stumps (from thinning) was noted for each quadrat in hopes of obtaining some insight into logging history.

Results

The Flora Considering that most of JECA is forested with ponderosa pine, the flora is surprisingly diverse, consisting of 393 taxa in 65 families. Much of the diversity is attributable to plant communities of limited extent, such as grasslands, deciduous woodlands in canyon bottoms (birch, aspen and boxelder) and palustrine communities around springs and seeps. The flora includes seven taxa listed as rare in South Dakota (Table I) by the South Dakota Natural Heritage Program (Hautcooper et al. 1985).

Forty-eight species at JECA are known to be exotic (introduced); of these, leafy spurge (Euphorbia esula), Canada thistle (Cirsium arvense) and field bindweed (Convolvulus arvensis) are considered noxious weeds

Table I. Rare plants of South Dakota occurring at Jewel Cave National Monument (Hautcooper et al., 1985).

<u>Taxon</u>	<u>South Dakota Natural Heritage Program Status*</u>	<u>Comments</u>	<u>Status at JECA</u>
<u>Carex richardsonii</u> (Richardson's Sedge)	U	occurs in forests of Black Hills; rare or extirpated in ND, WY.	two collections from pine forest on ridge s of Lithograph Cyn and in old area se of residence.
<u>Carex rossii</u> (Ross Sedge)	C(p)	several occurrences in pine forests of Black Hills and nw SD.	occasional in open pine forests.
<u>Festuca idahoensis</u> (Idaho Fescue)	U	reported for w SD but no sites have been verified.	one collection from draw s of VC parking lot; first known SD collection.
<u>Stipa robusta</u>	U	few occurrences in pine savannahs of s Black Hills.	one collection from JECA cited by Thomasson (1981).
<u>Erigeron formosissimus</u> (Beautiful Fleabane)	U	occurs in meadows of Black Hills; often confused with <u>E. glabellus</u> .	occasional in forest openings and on disturbed sites.
<u>Thelesperma megapotamicum</u> (Nippleseed, Thelesperma)	U	occurs in dry soil of sw SD; a primarily s Great Plains species.	several individuals near steps from VC to parking lot (probably planted).
<u>Townsendia hookeri</u> (Hooker's Townsendia)	U	few reports for exposed sites of sw SD.	many individuals on roadcut s of US Hwy 16 e of Hell Cyn.

*Status Codes

- C: uncommon; apparently secure in state but warrants monitoring; may be localized or declining.
 U: status undetermined; possibly rare, declining or extirpated in state; more information needed.
 (p): peripheral: a species whose occurrence in SD represents the edge of its natural range.

in Custer Co. Leafy spurge is locally common at Chokecherry Spring; individuals are occasionally found elsewhere. Canada thistle is scattered throughout the Monument near springs, seeps and culverts. Field bindweed occurs around the Visitor Center parking lot and sporadically on other disturbed sites.

The Vegetation JECA is extensively forested with ponderosa pine (Pinus ponderosa). Four pine associations were recognized (Table II).

The ponderosa pine-ninebark association is restricted to steep north-facing slopes. It is characterized by dense stands of relatively small pine trees. Sapling density is very high and stands of doghair are common. Ninebark (Physocarpus monogynous) dominates the understory, often to the exclusion of other species. Herbaceous groundcover is sparse to absent. At JECA the ponderosa pine-ninebark association correlates well with Vanocker soils, which are alfisols with very thin E horizons suggestive of relatively recent development (see discussion in Conclusions).

The ponderosa pine-snowberry association occurs on east- and west-facing slopes, gentle south-facing slopes and on near level upland topography such as ridgetops and benches. It intergrades with the ponderosa pine-little bluestem association. Stands are closed to somewhat open with relatively large individual trees. Doghair stands are common, but overall, saplings are less dense than in the ponderosa pine-ninebark association. The dominant understory species is snowberry (Symphoricarpos sp.*). Herbaceous groundcover ranges from absent to almost complete in areas transitional to ponderosa pine-little bluestem and grassland communities. Grassy openings are common. This community occurs on Vanocker, Sawdust and Paunsagunt soils, and is more strongly correlated with slope and aspect than soil type.

The ponderosa pine-little bluestem association characteristically consists of somewhat open to very open stands of pine with relatively large individual trees. Sapling densities are low although doghair stands do occur. Little bluestem (Andropogon scoparius) is the dominant understory species, and skunkbush (Rhus trilobata) is the most frequently encountered shrub. This association correlates well with the Sawdust soil, an entisol characteristic of steep south-facing slopes. The occurrence of entisols under forest vegetation in the JECA area has suggested that these sites have not been forested long enough for the development of alfisols (D. Hoeft pers. comm.).

*It is not clear whether this is Symphoricarpos albus or S. occidentalis (which are differentiated by flower morphology) because snowberry did not bloom on upland sites due to drought conditions. Pinus ponderosa-S. occidentalis is a very common pine association in the Black Hills (Thilenius 1971), suggesting that the upland snowberry at JECA is S. occidentalis. A year of normal precipitation should resolve the problem.

Table II. Pine associations of Jewel Cave National Monument.

Association	Tree density (ponderosa pine) (#/ha)	Sapling density (ponderosa pine) (#/ha)	Basal area, trees (ponderosa pine) (sq m/ha)	Average tree DBH (ponderosa pine) (cm)
Ponderosa pine-ninebark	392	7339	21.23	22
Ponderosa pine-snowberry	441	2403	24.66	27
Ponderosa pine- little bluestem	191	763	12.96	30
Ponderosa pine-gooseberry	450	160	20.43	24

The ponderosa pine-gooseberry association is represented by one stand large enough for sampling (in the bottom of Hell Canyon). Trees are moderately large and sapling density is low. Gooseberry (Ribes oxycanthoides) and snowberry (Symphoricarpos albus) are the most frequent associates. Chokecherry (Prunus virginiana) and common juniper (Juniperus communis) are common as well. This association also occupies the bottom of Lithograph Canyon, where snowberry seems to be more abundant than in Hell Canyon.

The unlogged portion of JECA (the old area) is vegetated mainly with ponderosa pine-snowberry forest. It differs from corresponding stands in the remainder of the Monument in that trees average larger and sapling density is much higher. However, the old area probably is not extensive enough for comparisons to be valid. Cut stumps were found in all forest stands except those in the old area. Most were well on the way to decomposition (as determined by the kick test), making it impossible to determine relative age.

Two grassland types occur at JECA. The western wheatgrass-blue grama association is best developed on the alluvial Cordeston-Winetti soil complex in the bottom of Hell Canyon near its confluence with Lithograph Canyon. This community also occurs on gentle topography in openings in ponderosa pine-snowberry forest. On steeper slopes and ridgetops, little bluestem is dominant. Both western wheatgrass-blue grama and western wheatgrass-little bluestem communities show evidence of pine invasion in the form of ponderosa pine saplings and seedlings.

Shrublands are uncommon at JECA. Snowberry (Symphoricarpos albus) thickets occur in the bottoms of canyons. Mountain mahogany (Cercocarpus montanus), which is abundant on the Minnekahta limestone less than 35 km to the west, occurs only sporadically.

Conclusions

JECA is vegetated predominantly with ponderosa pine forest, but the occurrence of small stands of other communities contributes to a surprising diversity of plant life (393 taxa in 516 ha). Resource management should be aimed at preserving this diversity, as well as at maintaining ponderosa pine communities in their natural states.

Because many of the plant communities and corresponding species at JECA occur only in one to several sites of limited extent, care should be taken to protect these sites from disturbance. Such sites include springs and seeps, grasslands in the bottom of Hell Canyon, the canyon bottom and adjacent lower north-facing slope along the north boundary and canyon and ravine bottoms in general. Grazing is a threat at this time, for the Monument is not completely fenced off from surrounding lands. Cattle occasionally escape from nearby USFS allotments and enter the Monument. During August, 1985, a small (probably less than 20 head) herd remained in the Hell Canyon area for several weeks. During that time, the grassland vegetation was cropped to near ground level and the vegetation around Prairie Dog Spring was heavily grazed and trampled.

Construction of a fence to keep out errant cattle is strongly recommended.

Every effort should be made to eliminate leafy spurge from Chokecherry Spring. Because the stand is small, mechanical methods may be a reasonable alternative to herbicide treatment, which could affect native vegetation. Canada thistle, represented by small stands at springs and seeps, should be eliminated as well. Field bindweed poses little threat to native vegetation at JECA, since it occurs only on disturbed sites.

Fire suppression in the Black Hills during white settlement times is thought to have led to the expansion of pine communities as the expense of grasslands (Progulske and Sowell 1974). Bock and Bock (1984) showed that periodic burning can eliminate pine seedlings from grasslands and pine savannas, and thus maintain these vegetation types. A burning program at JECA could be used toward achieving the following goals:

- reduction of pine invasion, thus maintaining grassland communities;
- opening up of ponderosa pine communities by increasing the area of grassy openings in ponderosa pine-snowberry communities and expanding the area occupied by ponderosa pine-little bluestem communities;
- reduction of understory cover and accumulated dead material in ponderosa pine-ninebark communities;
- reduction of doghair.

The topic of natural ponderosa pine forest conditions is controversial. Vegetation changes both in space and time in response to factors such as soil type, aspect, climatic change, history (chance) and many others. While fire suppression undoubtedly has contributed to expansion of pine forest in the Black Hills, soils information from the JECA area suggests that the trend is independent of human activity to some degree. The presence of non-forest and relatively-young forest soils (such as the Sawdust and Vanocker) under sizeable stands of pine (often with many individuals well over 100 years old) indicates that the forests developed relatively recently, but before the arrival of the white man (D. Hoeft pers. comm.). In other words, pine forest expansion in the Black Hills may be in part a natural phenomenon.

A reasonable objective for ponderosa pine management at JECA would be to maintain a mosaic of ponderosa pine communities through periodic burning of some stands, and thinning and removal of accumulated dead material where levels are unsafe for burning. A fire history study is needed to estimate a suitable periodicity for burning. Stands should be sampled before as well as after burns, as the data collected for this mapping project may be too general to detect certain vegetation changes.

Literature Cited

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Progulske, D.R. and R.H. Sowell. 1974. Yellow ore, yellow hair, yellow pine. A photographic study of a century of forest ecology. *South Dakota Agric. Exp. Sta. Bull.* 616: 1-169.

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CHECKLIST OF VASCULAR PLANTS OF
JEWEL CAVE NATIONAL MONUMENT

H. MARRIOTT
1985

In this list, species are arranged alphabetically within genera, genera within families, and families within the major groups pteridophytes, gymnosperms and angiosperms. The following codes are used:

three letter family codes: see enclosed sheet

E: exotic (introduced)

E*: native to South Dakota but most likely introduced at JECA

E?: native status unclear

**: a collection of Stipa robusta from JECA was cited by Thomasson (1981); no specimen on file at Monument.

FAM

TAXON

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- EQU EQUISETUM LAEVIGATUM A. BR.
PLP CHEILANTHES FEEI T. MOORE
PLP CYSTOPTERIS FRAGILIS (L.) BERNH. VAR. FRAGILIS
PLP PELLAEA ATROPURPUREA (L.) LINK
PLP PELLAEA OCCIDENTALIS (E. NELS.) RYDB.
CUP JUNIPERUS COMMUNIS L. VAR. DEPRESSA PURSH
CUP JUNIPERUS SCOPULORUM SARG.
PIN PINUS PONDEROSA DOUGL. EX P. & C. LAWSON
ACE ACER NEGUNDO L. VAR. INTERIUS (BRITT.) SARG.
AMA AMARANTHUS BLITOIDES WATS.
AMA AMARANTHUS RETROFLEXUS L.
ANA RHUS TRILOBATA NUTT. VAR. TRILOBATA
ANA TOXICODENDRON RYDBERGII (SMALL EX RYDB.) GREENE
E API HERACLEUM SPHONDYLIIUM L.
API LOMATIUM FOENICULACEUM (NUTT.) COULT. & ROSE VAR. FOENICULACEUM
API LOMATIUM ORIENTALE COULT. & ROSE
API MUSINEON TENUIFOLIUM NUTT. EX T. & G.
API OSMORHIZA DEPAUPERATA PHIL.
API SANICULA MARILANDICA L.
API ZIZIA APTERA (GRAY) FERN.
APO APOCYNUM ANDROMAESIFOLIUM L. VAR. ANDROMAESIFOLIUM
ASC ASCLEPIAS OVALIFOLIA DCNE.
ASC ASCLEPIAS PUMILA (GRAY) VAIL
ASC ASCLEPIAS SPECIOSA TORR.
AST ACHILLEA MILLEFOLIUM L. VAR. LANULOSA (NUTT.) PIPER
AST AGOSERIS GLAUCA (PURSH) RAF. VAR. GLAUCA
AST AMBROSIA ARTEMISIIFOLIA L. VAR. ELATIOR (L.) DESC.
AST AMBROSIA PSILOSTACHYA DC. VAR. CORONOPHIFOLIA (T. & G.) FARW.
AST ANTENNARIA NEGLECTA GREENE VAR. ATTENUATA (FERN.) CRONQ.
AST ANTENNARIA PARVIFOLIA NUTT.
AST ANTENNARIA ROSEA GREENE
E AST ARCTIUM MINUS (HILL) BERNH.
AST ARTEMISIA BIENNIS WILLD.
AST ARTEMISIA CANA PURSH SSP. CANA
AST ARTEMISIA DRACUNCULUS L.
AST ARTEMISIA FRIGIDA WILLD.
AST ARTEMISIA LUDOVICIANA NUTT. VAR. LUDOVICIANA
AST ASTER FALCATUS LINDL. SSP. COMMUTATUS (T. & G.) A. G. JONES
VAR. COMMUTATUS
AST ASTER LAEVIS L. VAR. GEYERI GRAY
AST ASTER OBLONGIFOLIUS NUTT.
AST CHRYSOTHAMNUS NAUSEOSUS (PALL. EX PURSH)
SSP. GRAVEOLENS (NUTT.) PIPER
E AST CIRSIUM ARVENSE (L.) SCOP.
AST CIRSIUM UNDULATUM (NUTT.) SPRENG.
E AST CIRSIUM VULGARE (SAVI) TENORE
AST CONYZA CANADENSIS (L.) CRONQ. VAR. CANADENSIS
AST DYSSODIA PAPPOSA (VENT.) HITCHC.
AST ECHINACEA PALLIDA NUTT. VAR. ANGUSTIFOLIA (DC.) CRONQ.
AST ERIGERON CANUS GRAY
AST ERIGERON FLAGELLARIS GRAY
AST ERIGERON FORMOSISSIMUS GREENE VAR. FORMOSISSIMUS
AST ERIGERON STRIGOSUS MUHL. EX WILLD. VAR. STRIGOSUS

- AST ERIGERON SUBTRINERVIS RYDB. EX PORTER & BRITT. VAR. SUBTRINERVIS
- AST GAILLARDIA ARISTATA PURSH
- AST GRINDELIA SQUARROSA (PURSH) DUNAL VAR. QUASIPERENNIS LUNELL
- AST GUTIERREZIA SAROTHRÆ (PURSH) BRITT. & RUSBY
- AST HELIANTHUS ANNUUS L.
- AST HELIANTHUS RIGIDUS (CASS.) DESF. VAR. SUBRHOMBOIDEUS (RYDB.) CRONQ.
- AST HETEROTHECA VILLOSA (PURSH) SHINNERS
- AST HYMENOPAPPUS FILIFOLIS HOOK. VAR. POLYCEPHALUS (OSTERH.) TURNER
- AST HYMENOXYS ACAULIS (PURSH) PARKER
- AST IVA XANTHIFOLIA NUTT.
- AST KUHNIA EUPATORIODES L. VAR. CORYMBULOSA T. & G.
- AST LACTUCA LUDOVICIANA (NUTT.) RIDD.
- AST LACTUCA OBLONGIFOLIA NUTT.
- E AST LACTUCA SERRIOLA L.
- AST LIATRIS LIGULISTYLUS (A. NELS.) SCHUM.
- AST LIATRIS PUNCTATA HOOK.
- AST LYGOESMIA JUNCEA (PURSH) D. DON
- AST MACHAERANTHERA LINEARIS GREENE
- AST MACHAERANTHERA PINNATIFIDA (HOOK.) SHINNERS VAR. PINNATIFIDA
- E AST MATRICARIA MATRICARIOIDES (LESS.) PORTER
- AST NOTHOCALAIS CUSPIDATA (PURSH) GREENE
- AST RATIBIDA COLUMNIFERA (NUTT.) WOOT. & STANDL. —
- AST RUDBECKIA HIRTA L. VAR. PULCHERRIMA FARW.
- AST SENEIO CANUS HOOK.
- AST SENEIO INTEGERRIMUS NUTT. VAR. INTEGERRIMUS
- AST SENEIO PAUPERULUS MICHX.
- AST SENEIO RIDDELLII T. & G.
- AST SOLIDAGO CANADENSIS L. VAR. GILVOCANESCENS RYDB.
- AST SOLIDAGO MISSOURIENSIS NUTT. VAR. MISSOURIENSIS
- AST SOLIDAGO MISSOURIENSIS NUTT. VAR. FASCICULATA HOLZ.
- AST SOLIDAGO MOLLIS BARTL. VAR. MOLLIS
- AST SOLIDAGO NEMORALIS AIT.
- VAR. LONGIPETIOLATA (MACK. & BUSH) PALMER & STEYERM.
- AST SOLIDAGO PTARMICOIDES (NEES) BOIVIN
- AST SOLIDAGO RIGIDA L. VAR. HUMILIS PORTER
- E AST SONCHUS ASPER (L.) HILL
- E AST TARAXACUM LAEVIGATUM (WILLD.) DC.
- E AST TARAXACUM OFFICINALE WEBER
- E* AST THELESPERMA MEGAPOTAMICUM (SPRENG.) KUNTZE
- AST TOWNSENDIA HOOKERI BEAMAN
- E AST TRAGOPOGON DUBIUS SCOP.
- BER MAHONIA REPENS (LINDL.) G. DON
- BET BETULA PAPYRIFERA MARSH. VAR. PAPYRIFERA
- E BOR CYNOGLOSSUM OFFICINALE L.
- BOR HACKELIA DEFLEXA (WAHLENB.) OPIZ
- VAR. AMERICANA (GRAY) FERN. & I. M. JOHNST.
- BOR LAPPULA SQUARROSA (RETZ.) DUMORT.
- BOR LITHOSPERMUM INCISUM LEHM.
- BOR MERTENSIA LANCEOLATA (PURSH) DC. EX A. DC.
- BOR OSNOMODIUM MOLLE MICHX. VAR. OCCIDENTALE (MACK.) I. M. JOHNST.
- E BRA ALYSSUM DESERTORUM STAPF
- BRA ARABIS HIRSUTA (L.) SCOP. VAR. PYCNOCARPA (M. HOPK.) ROLL.
- BRA ARABIS HOLBOELLII HORNEM. VAR. COLLINSII (FERN.) ROLL.
- BRA ARABIS HOLBOELLII HORNEM. VAR. PINETORUM (TIDEST.) ROLL.
- E BRA CAMELINA MICROCARPA ANDRZ. EX DC.

E BRA CAPSELLA BURSA-PASTORIS (L.) MEDIC. VAR. BURSA-PASTORIS
 E BRA CONRINGIA ORIENTALIS (L.) DUMORT.
 BRA DESCURAINIA PINNATA (WALT.) BRITT. VAR. FILIPES (GRAY) PECK
 BRA DESCURAINIA SOPHIA (L.) WEBB EX PRANTL
 BRA DRABA REPTANS (LAM.) FERN. VAR. REPTANS
 BRA ERYSIMUM ASPERUM (NUTT.) DC.
 BRA ERYSIMUM CHEIRANTHOIDES L. SSP. ALTUM AHTI
 BRA ERYSIMUM INCONSPICUUM (WATS.) MACM. VAR. INCONSPICUUM
 BRA LEPIDIUM DENSIFLORUM SCHRAD.
 BRA LESQUERELLA ARENOSA (RICHARDS.) RYDB. VAR. ARENOSA
 E BRA SISYMBRIUM ALTISSIMUM L.
 E BRA THLASPI ARVENSE L.
 CAC CORYPHANTHA MISSOURIENSIS (SWEET) BRITT. & ROSE VAR. MISSOURIENSIS
 CAC OPUNTIA FRAGILIS (NUTT.) HAW. VAR. FRAGILIS
 CAC OPUNTIA POLYACANTHA HAW. VAR. POLYACANTHA
 CAM CAMPANULA ROTUNDIFOLIA L.
 CAM LOBELIA SPICATA LAM.
 CAN HUMULUS LUPULUS L. VAR. NEOMEXICANUS NELS. & CKLL.
 CPR LINNAEA BOREALIS L. VAR. LONGIFLORA TORR.
 CPR LONICERA DIOICA L. VAR. GLAUDESCENS (RYDB.) BUTTERS
 CPR SYMPHORICARPOS ALBUS (L.) BLAKE
 CPR SYMPHORICARPOS OCCIDENTALIS HOOK.
 CAR ARENARIA LATERIFLORA L.
 CAR CERASTIUM ARVENSE L.
 E CAR LYCHNIS ALBA MILL.
 CAR LYCHNIS DRUMMONDII (HOOK.) WATS.
 CAR PARONYCHIA SESSILIFLORA NUTT.
 E CHE CHENOPODIUM ALBUM L.
 CHE CHENOPODIUM BERLANDIERI MOQ. VAR. ZSCHACKEI (J. MURR.) J. MURR.
 E CHE CHENOPODIUM HYBRIDUM L.
 CHE CHENOPODIUM PRATERICOLA RYDB.
 E CHE KOCHIA SCOPARIA (L.) SCHRAD.
 E CHE SALSOLA KALI L. VAR. TENUIFOLIA TAUSCH.
 E CNV CONVULVULUS ARVENSIS L.
 COR CORNUS STOLONIFERA MICHX.
 CRS SEDUM LANCEOLATUM TORR.
 CYP CAREX AUREA NUTT.
 CYP CAREX BACKII BOOTT
 CYP CAREX BREVIOR (DEWEY) MACK. EX LUNELL
 CYP CAREX DEWEYANA SCHWEIN.
 CYP CAREX EBURNEA BOOTT
 CYP CAREX FILIFOLIA NUTT.
 CYP CAREX FOENA WILLD.
 CYP CAREX HELIOPHILA MACK.
 CYP CAREX LANUGINOSA MICHX.
 CYP CAREX MICROPTERA MACK.
 CYP CAREX NEBRASKENSIS DEWEY
 CYP CAREX PECKII HOWE
 CYP CAREX RICHARDSONII R. BR.
 CYP CAREX ROSSII BOOTT
 CYP CAREX SPRENGELLII DEWEY EX SPRENG.
 CYP ELEOCHARIS PALUSTRIS (L.) R. & S.
 CYP SCIRPUS PALLIDUS (BRITT.) FERN.
 CYP SCIRPUS VALIDUS VAHL
 E ELE ELEAGNUS ANGUSTIFOLIA L.

LAM DRACOCEPHALUM PARVIFLORUM NUTT.
 LAM HEDEOMA DRUMMONDII BENTH.
 E LAM LEONURUS CARDIACA L.
 E LAM MARRUBIUM VULGARE L.
 LAM MENTHA ARVENSIS L. VAR. GLABRATA (BENTH.) FERN.
 LAM MONARDA FISTULOSA L. VAR. MENTHAEFOLIA (GRAH.) FERN.
 LAM PRUNELLA VULGARIS L. VAR. LANCEOLATA (BARTON) FERN.
 LAM SALVIA REFLEXA HORNEM.
 LAM STACHYS PALUSTRIS L. VAR. PILOSA (NUTT.) FERN.
 LIL ALLIUM CERNUUM ROTH
 LIL ALLIUM GEYERI WATS.
 LIL ALLIUM TEXTILE NELS. & MACBR.
 LIL CALOCHORTUS GUNNISONII WATS.
 LIL DISPORUM TRACHYCARPUM (WATS.) BENTH. & HOOK.
 LIL FRITILLARIA ATROPURPUREA NUTT.
 LIL LEUCOCRINUM MONTANUM NUTT. EX GRAY
 LIL LILIUM PHILADELPHICUM L. VAR. ANDINUM (NUTT.) KER
 LIL SMILACINA STELLATA (L.) DESF.
 LIL SMILAX HERBACEA L. VAR. LASIONEURON (HOOK.) A. DC.
 LIL YUCCA GLAUCA NUTT. VAR. GLAUCA
 LIL ZIGADENUS ELEGANS PURSH SSP. ELEGANS
 LIL ZIGADENUS VENENOSUS WATS. VAR. GRAMINEUS (RYDB.) WALSH EX PECK
 LIN LINUM LEWISII PURSH VAR. LEWISII
 LIN LINUM RIGIDUM PURSH VAR. COMPACTUM (A. NELS.) C. ROGERS
 MAL SPHAERALCEA COCCINEA (NUTT.) RYDB.
 NYC MIRABILIS LINEARIS (PURSH) HEIMERL
 NYC MIRABILIS NYCTAGINEA (MICHX.) MACM.
 ONA EPILOBIUM ANGUSTIFOLIUM L. SSP. ANGUSTIFOLIUM
 ONA EPILOBIUM CILIATUM RAF. SSP. GLANDULOSUM (LEHM.) HOCH & RAVEN
 ONA GAURA COCCINEA NUTT. EX PURSH
 ONA OENOTHERA CORONOPIFOLIA T. & G.
 ONA OENOTHERA NUTTALLII SWEET
 ONA OENOTHERA VILLOSA THUNB. SSP. CANOVIRENS (STEELE) D. DIETR. & RAVEN
 ONA OENOTHERA VILLOSA THUNB. SSP. STRIGOSA (RYDB.) D. DIETR. & RAVEN
 ORC COELOGLOSSUM VIRIDE (L.) HARTM. VAR. VIRESCENS (MUHL. EX WILLD.) LUER
 ORC CORALLORHIZA MACULATA RAF.
 ORO OROBANCHE FASCICULATA NUTT.
 OXL OXALIS DILLENII JACQ.
 E PTG PLANTAGO MAJOR L.
 PTG PLANTAGO PATAGONICA JACQ. VAR. PATAGONICA
 POA AGROPYRON ALBICANS SCRIBN. & SM. VAR. GRIFFITHSII (SCRIBN. & SM.) BEETLE
 E POA AGROPYRON CRISTATUM (L.) GAERTN.
 E POA AGROPYRON ELONGATUM (HOST) BEAUV.
 E POA AGROPYRON REPENS (L.) BEAUV.
 POA AGROPYRON SMITHII RYDB. F. SMITHII
 POA AGROPYRON SUBSECUNDUM (LINK) HITCHC.
 -POA AGROPYRON TRACHYCAULUM (LINK) MALTE EX LEWIS
 POA AGROSTIS STOLONIFERA L. VAR. STOLONIFERA
 POA ANDROPOGON GERARDII VITMAN
 POA ANDROPOGON SCOPARIUS MICHX. VAR. SCOPARIUS
 POA ARISTIDA FENDLERIANA STEUD.
 POA ARISTIDA LONGISETA STEUD.
 POA BOUTELOUA CURTIPENDULA (MICHX.) TORR. VAR. CURTIPENDULA
 POA BOUTELOUA GRACILIS (H.B.K.) LAG. EX GRIFFITHS VAR. GRACILIS
 POA BROMUS ANOMALUS RUPR. EX FOURN.

E* ELE SHEPHERDIA ARGENTEA (PURSH) NUTT.
 ELE SHEPHERDIA CANADENSIS (L.) NUTT.
 ERI ARCTOSTAPHYLOS UVA-URSI (L.) SPRENG. SSP. UVA-URSI
 ERI PYROLA CHLORANTHA SW.
 ERI PYROLA SECUNDA L.
 E EUP EUPHORBIA ESULA L.
 EUP EUPHORBIA GLYPTOSPERMA ENGELM.
 EUP EUPHORBIA ROBUSTA (ENGELM.) SMALL
 EUP EUPHORBIA STRICTOSPOREA ENGELM.
 FAB ASTRAGALUS ABORIGINUM RICHARDS.
 FAB ASTRAGALUS ADSURGENS PALL. VAR. ROBUSTIOR HOOK.
 FAB ASTRAGALUS CRASSICARPUS NUTT. VAR. CRASSICARPUS
 FAB ASTRAGALUS DRUMMONDII DOUGL. EX HOOK.
 FAB ASTRAGALUS FLEXUOSUS (HOOK.) DOUGL. EX G. DON
 FAB ASTRAGALUS GILVIFLORUS SHELDR.
 FAB ASTRAGALUS MISSOURIENSIS NUTT. VAR. MISSOURIENSIS
 FAB ASTRAGALUS SPATHULATUS SHELDR.
 E FAB CORONILLA VARIA L.
 FAB GLYCYRRHIZA LEPIDOTA PURSH VAR. GLUTINOSA (NUTT.) WATS.
 FAB HEDYSARUM ALPINUM L.
 FAB LATHYRUS OCHROLEUCUS HOOK.
 FAB LUPINUS ARGENTUS PURSH VAR. ARGENTUS
 E FAB MEDICAGO LUPULINA L.
 E FAB MEDICAGO SATIVA L.
 E FAB MELILOTUS ALBA MEDIC.
 E FAB MELILOTUS OFFICINALIS (L.) PALL.
 FAB OXYTROPIS CAMPESTRIS (L.) DC. VAR. GRACILIS (A. NELS.) BARNEBY
 FAB OXYTROPIS LAMBERTII PURSH VAR. LAMBERTII
 FAB OXYTROPIS SERICEA NUTT. VAR. SERICEA
 FAB PETALOSTEMON OCCIDENTALE (HELLER EX BRITT. & KEARN.) FERN.
 FAB PETALOSTEMON PURPUREUM (VENT.) RYDB.
 FAB PSORALEA ARGOPHYLLA PURSH
 FAB PSORALEA ESCULENTA PURSH
 E* FAB PSORALEA TENUIFLORA PURSH
 FAB THERMOPSIS RHOMBIFOLIA (NUTT. EX PURSH) NUTT. EX RICHARDS.
 E FAB TRIFOLIUM HYBRIDUM L.
 E FAB TRIFOLIUM PRATENSE L.
 E FAB TRIFOLIUM REPENS L.
 FAB VICIA AMERICANA MUHL. EX WILLD. VAR. AMERICANA
 FAB VICIA AMERICANA MUHL. EX WILLD. VAR. MINOR HOOK.
 FUM CORYDALIS AUREA WILLD. VAR. AUREA
 GEN FRASERA SPECIOSA DOUGL. EX GRISEB.
 GER GERANIUM RICHARDSONII FISCH. & TRAUTV.
 GRS RIBES AMERICANUM MILL.
 GRS RIBES AUREUM PURSH VAR. AUREUM
 GRS RIBES CEREUM DOUGL. VAR. INEBRIANS (LINDL.) C. L. HITCHC.
 GRS RIBES OXYACANTHOIDES L. SSP. OXYACANTHOIDES
 HYD ELLISIA NYCTELEA (L.) L.
 IRI IRIS MISSOURIENSIS NUTT.
 IRI SISYRINCHIUM MONTANUM GREENE
 JUN JUNCUS BALTICUS WILLD. VAR. MONTANUS ENGELM.
 JUN JUNCUS INTERIOR WIEG. VAR. INTERIOR
 JUN JUNCUS LONGISTYLUS TORR. VAR. LONGISTYLUS
 JUN JUNCUS TENUIS WILLD. VAR. DUDLEYI (WIEG.) F. J. HERM.
 LAM AGASTACHE FOENICULUM (PURSH) KUNTZE

E POA BROMUS COMMUTATUS SCHRAD.
 E POA BROMUS INERMIS LEYSS. SSP. INERMIS
 E POA BROMUS INERMIS LEYSS. SSP. PUMPELLIANUS (SCRIBN.) WAGNON
 VAR. PURPURASCENS (HOOK.) WAGNON
 E POA BROMUS JAPONICUS THUNB.
 E POA BROMUS TECTORUM L.
 POA BUCHLOE DACTYLOIDES (NUTT.) ENGELM.
 POA DANTHONIA INTERMEDIA VASEY
 POA DANTHONIA SPICATA (L.) BEAUV. EX R. & S. VAR. PINETORUM PIPER
 POA DISTICHLIS SPICATA (L.) GREENE VAR. STRICTA (TORR.) SCRIBN.
 POA ECHINOCHLOA MURICATA (BEAUV.) FERN. VAR. MICROSTACHYA WIEG.
 POA ELYMUS CANADENSIS L. VAR. CANADENSIS
 POA ELYMUS INNOVATUS BEAL VAR. INNOVATUS
 POA ELYMUS VILLOSUS MUHL. EX WILLD.
 E POA ERAGROSTIS CILIANENSIS (ALL.) LUTATI
 POA FESTUCA IDAHOENSIS ELMER
 POA FESTUCA OVINA L. VAR. RYDBERGII ST. YVES
 POA GLYCERIA STRIATA (LAM.) HITCHC. VAR. STRICTA (SCRIBN.) FERN.
 POA HIEROCHLOE ODORATA (L.) BEAUV.
 POA HORDEUM BRACHYANTHERUM NEVSKI
 POA HORDEUM JUBATUM L. VAR. JUBATUM
 POA KOELERIA MACRANTHA (LEDEB.) SCHULT.
 POA MUHLENBERGIA ASPERIFOLIA MICHX.
 POA MUHLENBERGIA CUSPIDATA (TORR. EX HOOK.) RYDB.
 POA MUHLENBERGIA RACEMOSA (MICHX.) B.S.P.
 POA ORYZOPSIS ASPERIFOLIA MICHX.
 POA ORYZOPSIS HYMENOIDES (R. & S.) RICKER EX PIPER
 POA ORYZOPSIS MICRANTHA (TRIN. & RUPR.) THURB.
 POA PANICUM CAPILLARE L.
 POA PANICUM VIRGATUM L.
 E POA PHLEUM PRATENSE L.
 POA POA COMPRESSA L.
 POA POA FENDLERIANA (STEUD.) VASEY
 POA POA INTERIOR RYDB.
 POA POA PALUSTRIS L.
 E? POA POA PRATENSIS L.
 POA POA SANDBERGII VASEY
 POA POA TRIVIALIS L.
 POA SCHEDONNARDUS PANICULATUS (NUTT.) TREL.
 POA SCHIZACHNE PURPURASCENS (TORR.) SWALL.
 E POA SETARIA VIRIDIS (L.) BEAUV.
 E* POA SORGHASTRUM NUTANS (L.) NASH
 POA SPHENOPHOLIS OBTUSATA (MICHX.) SCRIBN.
 POA SPOROBOLUS CRYPTANDRUS (TORR.) TORR.
 POA SPOROBOLUS HETEROLEPIS (GRAY) GRAY
 POA STIPA COMATA TRIN. & RUPR. VAR. COMATA
 POA STIPA RICHARDSONII LINK
 ** POA STIPA ROBUSTA (VASEY) SCRIBN.
 POA STIPA SPARTEA TRIN.
 POA STIPA VIRIDULA TRIN.
 PLM IPOMOPSIS CONGESTA (HOOK.) GRANT SSP. CONGESTA
 PLM PHLOX ALYSSIFOLIA GREENE
 PLM PHLOX HOODII RICHARDS.
 PGL POLYGALA ALBA NUTT. VAR. ALBA
 PGL POLYGALA SENEGA L.

PLG POLYGONUM ACHOREUM BLAKE
 E PLG RUMEX CRISPUS L.
 PRM ANDROSACE SEPTENTRIONALIS L.
 PRM DODECATHEON PULCHELLUM (RAF.) MERR.
 PRM LYSIMACHIA CILIATA L.
 RAN ACTAEA RUBRA (AIT.) WILLD.
 RAN ANEMONE CYLINDRICA GRAY
 RAN ANEMONE MULTIFIDA POIR. VAR. MULTIFIDA
 RAN ANEMONE PATENS L.
 RAN AQUILEGIA BREVIETYLA HOOK.
 RAN CLEMATIS COLUMBIANA (NUTT.) T. & G. VAR. COLUMBIANA
 RAN CLEMATIS COLUMBIANA (NUTT.) T. & G. VAR. TENUILOBA (GRAY) J. PRINGLE
 RAN CLEMATIS LIGUSTICIFOLIA NUTT. VAR. LIGUSTICIFOLIA
 RAN DELPHINIUM BICOLOR NUTT.
 RAN RANUNCULUS CYMBALARIA PURSH
 RAN RANUNCULUS MACOUNII BRITT.
 RAN RANUNCULUS MICRANTHUS NUTT.
 RAN RANUNCULUS RHOMBOIDEUS GOLDIE
 RAN THALICTRUM FENDLERI ENGELM. EX GRAY
 ROS AMELANCHIER ALNIFOLIA (NUTT.) NUTT.
 ROS CERCOCARPUS MONTANUS RAF.
 ROS FRAGARIA VIRGINIANA DUCHN. VAR. GLAUCA WATS.
 ROS GEUM ALEPPICUM JACQ.
 ROS GEUM TRIFLORUM PURSH
 ROS PHYSOCARPUS MONOGYNUS (TORR.) COULT.
 ROS POTENTILLA ARGUTA PURSH
 ROS POTENTILLA CONCIINNA RICHARDS. VAR. CONCIINNA
 ROS POTENTILLA EFFUSA DOUGL. EX LEHM. VAR. EFFUSA
 ROS POTENTILLA FISSA NUTT.
 ROS POTENTILLA FRUTICOSA L.
 ROS POTENTILLA GLANDULOSA LINDL. VAR. PSEUDORUPESTRIS (RYDB.) C. L. HITCHC.
 ROS POTENTILLA HIPPIANA LEHM. VAR. HIPPIANA
 ROS POTENTILLA NORVEGICA L. SSP. MONSPELIENSIS (L.) ASCH. & GRAEBN.
 ROS POTENTILLA PENNSYLVANICA L.
 ROS POTENTILLA PULCHERRIMA LEHM.
 ROS PRUNUS VIRGINIANA L. VAR. MELANOCARPA (A. NELS.) SARG.
 ROS ROSA ACICULARIS LINDL. SSP. SAYI (SCHWEIN.) W. H. LEWIS
 ROS ROSA ARKANSANA PORTER
 ROS ROSA WOODSII LINDL.
 ROS RUBUS IDAEUS L. SSP. SACHALINENSIS (LEVL.) FOCKE
 RUB GALIUM APARINE L.
 RUB GALIUM BOREALE L.
 RUB GALIUM TRIFLORUM MICHX.
 SAL POPULUS TREMULOIDES MICHX.
 SAN COMANDRA UMBELLATA (L.) NUTT. VAR. PALLIDA (A. DC.) JONES
 SAX HEUCHERA RICHARDSONII R. BR.
 SCR BESSEYA WYOMINGENSIS (A. NELS.) RYDB.
 SCR CASTILLEJA SESSILIFLORA PURSH
 SCR CASTILLEJA SULPHUREA RYDB.
 SCR COLLINSIA PARVIFLORA LINDL.
 SCR ORTHOCARPUS LUTEUS NUTT.
 SCR PENSTEMON ALBIDUS NUTT.
 SCR PENSTEMON ERIANTHERUS PURSH VAR. ERIANTHERUS
 SCR PENSTEMON GLABER PURSH
 SCR SCROPHULARIA LANCEOLATA PURSH

E SCR VERBASCUM THAPSUS L.
SCR VERONICA AMERICANA SCHWEIN. EX BENTH.
E SOL HYOCYMUS NIGER L.
SOL PHYSALIS VIRGINIANA MILL. VAR. SONORAE (TORR.) WATERFALL
SOL SOLANUM ROSTRATUM DUNAL
TYP TYPHA LATIFOLIA L.
URT PARIETARIA PENNSYLVANICA MUHL. EX WILLD.
URT URTICA DIOICA L. SSP. GRACILIS (AIT.) SELAND.
VAL VALERIANA EDULIS NUTT. EX T. & G. VAR. EDULIS
VRB VERBENA BRACTEATA LAG. & RODR.
VRB VERBENA STRICTA VENT.
VIO VIOLA ADUNCA SM. VAR. ADUNCA
VIO VIOLA CANADENSIS L. VAR. RUGULOSA (GREENE) C. L. HITCHC.
VIO VIOLA NEPHROPHYLLA GREENE
VIO VIOLA NUTTALLII PURSH



DIRECTIONS FOR USE OF THE HERBARIUM

1. The sequence of folders in the herbarium, and of specimens within folders, is VERY IMPORTANT. Be very careful to return folders and specimens to their proper locations. As with library books, misplaced specimens are temporarily lost.
2. Use a stool for folders above your head so that the specimens are not damaged by bending.
3. Be careful not to crush folders in your arms while handling them. They should be carried horizontally, with both hands.
4. Take folders to a table, open flat and examine specimens while keeping them flat and right side up. NEVER TURN THEM OVER. Use both hands in moving sheets.
5. In returning folders to the cabinet, use one hand to lift the overlying ones. DO NOT FORCE A FOLDER BACK IN PLACE.
6. Close door of case when finished.
7. REMEMBER: It is very important to handle herbarium specimens carefully and to return them to their proper locations.

FILING SYSTEM FOR SPECIMENS

Pteridophytes (ferns and fern allies) are first in the herbarium. They are followed by gymnosperms (conifers) and angiosperms (flowering plants). Within these major groups, families are arranged alphabetically. Genera are arranged alphabetically within families and species within genera. The name of the plant appearing on the original label may not be the correct one -- if this is the case, the correct name will be given on an annotation label. The specimen should be filed by the annotated name.

Six families have two recognized names. The following names are used in the Jewel Cave Herbarium:

- Apiaceae (=Umbelliferae)
- Asteraceae (=Compositae)
- Brassicaceae (=Cruciferae)
- Fabaceae (=Leguminosae)
- Lamiaceae (=Labiatae)
- Poaceae (=Gramineae)



VASCULAR PLANTS OF
JEWEL CAVE NATIONAL MONUMENT

INDEX BY COMMON NAME

COMMON NAME	TAXON	FAM

ALFALFA	MEDICAGO SATIVA	FAB
ALSIKE CLOVER	TRIFOLIUM HYBRIDUM	FAB
ALUMROOT	HEUCHERA RICHARDSONII	SAX
ALYSSUM	ALYSSUM DESERTORUM	BRA
AMARANTH	AMARANTHUS SPP.	AMA
BALL-HEAD GILIA	IPOMOPSIS CONGESTA	PLM
BANEBERRY	ACTAEA RUBRA	RAN
BARNYARD GRASS	ECHINOCHLOA MURICATA	POA
BASTARD TOADFLAX	COMANDRA UMBELLATA	SAN
BEARDED WHEATGRASS	AGROPYRON SUBSECUNDUM	POA
BEDSTRAW	GALIUM SPP.	RUB
BENTGRASS	AGROSTIS STOLONIFERA	POA
BIG BLUESTEM	ANDROPOGON GERARDII	POA
BISCUIT ROOT	LOMATIUM FOENICULACEUM	API
BISCUIT ROOT	LOMATIUM ORIENTALE	API
BLACK CURRANT	RIBES AMERICANUM	GRS
BLACK MEDIC	MEDICAGO LUPULINA	FAB
BLACK-EYED SUSAN	RUDBECKIA HIRTA	AST
BLADDERPOD	LESQUERELLA ARENOSA	BRA
BLANKET FLOWER	GAILLARDIA ARISTATA	AST
BLAZINGSTAR	LIATRIS PUNCTATA	AST
BLUE COLUMBINE	AQUILEGIA BREVISTYLA	RAN
BLUE FLAX	LINUM LEWISII	LIN
BLUE GRAMA	BOUTELOUA GRACILIS	POA
BLUE LIPS	COLLINSIA PARVIFLORA	SCR
BLUE PENSTEMON	PENSTEMON GLABER	SCR
BLUE VIOLET	VIOLA ADUNCA	VIO
BLUE-EYED GRASS	SISYRINCHIUM MONTANUM	IRI
BLUE-EYED MARY	COLLINSIA PARVIFLORA	SCR
BLUEBELLS	MERTENSIA LANCEOLATA	BOR
BOG VIOLET	VIOLA NEPHROPHYLLA	VIO
BOXELDER	ACER NEGUNDO	ACE
BREADROOT SCURFPEA	PSORALEA ESCULENTA	FAB
BRITTLE FERN	CYSTOPTERIS FRAGILIS	PLP
BRITTLE PRICKLY PEAR	OPUNTIA FRAGILIS	CAC
BROOMWEED	GUTIERREZIA SAROTHRAE	AST
BUFFALO BUR	SOLANUM ROSTRATUM	SOL
BUFFALO GRASS	BUCHLOE DACTYLOIDES	POA
BULL THISTLE	CIRSIIUM VULGARE	AST
BULRUSH	SCIRPUS SPP.	CYP
BURDOCK	ARCTIUM MINUS	AST
BUTTERCUP	RANUNCULUS SPP.	RAN
BUTTERFLY WEED	GAURA COCCINEA	ONA
CAMPION	LYCHNIS DRUMMONDII	CAR
CANADA BLUEGRASS	POA COMPRESSA	POA
CANADA THISTLE	CIRSIIUM ARVENSE	AST
CANADIAN GOLDENROD	SOLIDAGO CANADENSIS	AST
CANADIAN VIOLET	VIOLA CANADENSIS	VIO
CANADIAN WILDRYE	ELYMUS CANADENSIS	POA
CANCERROOT	OROBANCHE FASCICULATA	ORO
CATTAIL	TYPHA LATIFOLIA	TYP
CHEATGRASS	BROMUS TECTORUM	POA

CHICKWEED	CERASTIUM ARVENSE	CAR
CHOCKECHERRY	PRUNUS VIRGINIANA	ROS
CINQUEFOIL	POTENTILLA SPP.	ROS
CLIFF BRAKE	PELLAEA OCCIDENTALIS	PLP
COMMON JUNIPER	JUNIPERUS COMMUNIS	CUP
COMMON PLANTAIN	PLANTAGO MAJOR	PTG
CORONILLA	CORONILLA VARIA	FAB
COW PARSNIP	HERACLEUM SPHONDYLII	API
CREeping JENNY	CONVOLVULUS ARVENSIS	CNV
CRESTED BEARDTONGUE	PENSTEMON ERIANTHERUS	SCR
CRESTED WHEATGRASS	AGROPYRON CRISTATUM	POA
CUDWEED SAGEWORT	ARTEMISIA LUDOVICIANA	AST
CUTLEAF	HYMENOPAPPUS FILIFOLIS	AST
DANDELION	TARAXACUM SPP.	AST
DEATH CAMAS	ZIGADENUS VENENOSUS	LIL
DOCK	RUMEX CRISPUS	PLG
DOGBANE	APOCYNUM ANDROMAESIFOLIUM	APO
DOWNY CHESS	BROMUS TECTORUM	POA
DOWNY PAINTED CUP	CASTILLEJA SESSILIFLORA	SCR
DRABA	DRABA REPTANS	BRA
DRABA LOCOWEED	ASTRAGALUS SPATHULATUS	FAB
DRAGONHEAD	DRACOCEPHALUM PARVIFLORUM	LAM
DWARF MILKWEED	ASCLEPIAS PUMILA	ASC
EDIBLE VALERIAN	VALERIANA EDULIS	VAL
ELLISIA	ELLISIA NYCTELEA	HYD
EVENING PRIMROSE	OENOTHERA SPP.	ONA
FAIRY BELLS	DISPORUM TRACHYCARPUM	LIL
FALSE BONESET	KUHNIA EUPATORIODES	AST
FALSE GROMWELL	OSNOMODIUM MOLLE	BOR
FALSE MELIC	SCHIZACHNE PURPURASCENS	POA
FALSE PENNYROYAL	HEDEOMA DRUMMONDII	LAM
FALSE SOLOMON SEAL	SMILACINA STELLATA	LIL
FALSE TARRAGON	ARTEMISIA DRACUNCULUS	AST
FALSEFLAX	CAMELINA MICROCARPA	BRA
FENDLER THREE-AWN	ARISTIDA FENDLERIANA	POA
FETID MARGOLD	DYSSODIA PAPPOSA	AST
FIELD BINDWEED	CONVOLVULUS ARVENSIS	CNV
FIGWORT	SCROPHULARIA LANCEOLATA	SCR
FIREWEED	EPILOBIUM ANGUSTIFOLIUM	ONA
FOUR O'CLOCK	MIRABILIS SPP.	NYC
FOWL BLUEGRASS	POA PALUSTRIS	POA
FOWL MANNAGRASS	GLYCERIA STRIATA	POA
FOXTAIL BARLEY	HORDEUM JUBATUM	POA
FRINGED LOOSESTRIFE	LYSIMACHIA CILIATA	PRM
FRINGED SAGEBRUSH	ARTEMISIA FRIGIDA	AST
GAILLARDIA	GAILLARDIA ARISTATA	AST
GAYFEATHERS	LIATRIS PUNCTATA	AST
GIANT HYSSOP	AGASTACHE FOENICULUM	LAM
GOLDEN ASTER	HETEROTHECA VILLOSA	AST
GOLDEN CORYDALIS	CORYDALIS AUREA	FUM
GOLDEN CURRANT	RIBES AUREUM	GRS
GOLDENBANNER	THERMOPSIS RHOMBIFOLIA	FAB
GOLDENROD	SOLIDAGO SPP.	AST
GOLDENWEED	MACHAERANTHERA PINNATIFIDA	AST
GOOSEBERRY	RIBES OXYACANTHOIDES	GRS

GOOSEFOOT	CHENOPODIUM SPP.	CHE
GREEN BOG ORCHID	COELOGLOSSUM VIRIDE	ORC
GREEN BRISTLEGRASS	SETARIA VIRIDIS	POA
GREEN GENTIAN	FRASERA SPECIOSA	GEN
GREEN NEEDLEGRASS	STIPA VIRIDULA	POA
GREENBRIAR	SMILAX HERBACEA	LIL
GROMWELL	LITHOSPERMUM INCISUM	BOR
GROUND PLUM	ASTRAGALUS CRASSICARPUS	FAB
GROUNDCHERRY	PHYSALIS VIRGINIANA	SOL
GROUNDSEL	SENECIO SPP.	AST
GUMWEED	GRINDELIA SQUARROSA	AST
HAIRY CHESSE	BROMUS COMMUTATUS	POA
HAIRY WILDRYE	ELYMUS INNOVATUS	POA
HARE'S EAR	CONRINGIA ORIENTALIS	BRA
HAREBELL	CAMPANULA ROTUNDIFOLIA	CAM
HEART-LEAVED ALEXANDERS	ZIZIA APTERA	API
HEDGENETTLE	STACHYS PALUSTRIS	LAM
HENBANE	HYOCYMUS NIGER	SOL
HOLLY GRAPE	MAHONIA REPENS	BER
HONEYSUCKLE	LONICERA DIOICA	CPR
HOPS	HUMULUS LUPULUS	CAN
HOREHOUND	MARRUBIUM VULGARE	LAM
HORSEMINT	MONARDA FISTULOSA	LAM
HORSETAIL	EQUISETUM LAEVIGATUM	EQU
HORSEWEED	CONYZA CANADENSIS	AST
HOUNDSTONGUE	CYNOGLOSSUM OFFICINALE	BOR
IDAHO FESCUE	FESTUCA IDAHOENSIS	POA
INDIAN RICEGRASS	ORYZOPSIS HYMENOIDES	POA
INDIAN-GRASS	SORGHASTRUM NUTANS	POA
INLAND BLUEGRASS	POA INTERIOR	POA
IVA	IVA XANTHIFOLIA	AST
JAPANESE BROME	BROMUS JAPONICUS	POA
JUNE BERRY	AMELANCHIER ALNIFOLIA	ROS
JUNEGRASS	KOELERIA MACRANTHA	POA
KENTUCKY BLUEGRASS	POA PRATENSIS	POA
KINNIKINNICK	ARCTOSTAPHYLOS UVA-URSI	ERI
KITTENTAIL	BESSEYA WYOMINGENSIS	SCR
KNOTWEED	POLYGONUM ACHOREUM	PLG
LAMBS QUARTERS	CHENOPODIUM SPP.	CHE
LARKSPUR	DELPHINIUM BICOLOR	RAN
LEAFY SPURGE	EUPHORBIA ESULA	EUP
LIP FERN	CHEILANTHES FEEI	PLP
LITTLE BLUESTEM	ANDROPOGON SCOPARIUS	POA
LITTLESEED RICEGRASS	ORYZOPSIS MICRANTHA	POA
LOBELIA	LOBELIA SPICATA	CAM
LOCOWEED	ASTRAGALUS SPP.	FAB
LOCOWEED	ASTRAGALUS SPP.	FAB
LUPINE	LUPINUS ARGENTEUS	FAB
MATCHBRUSH	GUTIERREZIA SAROTHRAE	AST
MEADOW BARLEY	HORDEUM BRACHYANTHERUM	POA
MEADOW PARSNIP	LOMATIUM ORIENTALE	API
MEADOW PARSNIP	LOMATIUM FOENICULACEUM	API
MEADOW RUE	THALICTRUM FENDLERI	RAN
MEADOW SALSIFY	TRAGOPOGON DUBIUS	AST
MILKWEED	ASCLEPIAS OVALIFOLIA	ASC

MILKWORT	POLYGALA ALBA	PGL
MISSOURI GOLDENROD	SOLIDAGO MISSOURIENSIS	AST
MISSOURI LOCOWEED	ASTRAGALUS MISSOURIENSIS	FAB
MISSOURI PINCUSHION	CORYPHANTHA MISSOURIENSIS	CAC
MOTHERWORT	LEONURUS CARDIACA	LAM
MOUNTAIN DANDELION	AGOSERIS GLAUCA	AST
MOUNTAIN DEATH CAMAS	ZIGADENUS ELEGANS	LIL
MOUNTAIN MAHOGANY	CERCOCARPUS MONTANUS	ROS
MOUNTAIN MILKWORT	POLYGALA SENEGA	PGL
MULLEIN	VERBASCUM THAPSUS	SCR
MUSINEON	MUSINEON TENUIFOLIUM	API
MUTTONGRASS	POA FENDLERIANA	POA
NEEDLE-AND-THREAD	STIPA COMATA	POA
NINEBARK	PHYSOCARPUS MONOGYNUS	ROS
NODDING BROME	BROMUS ANOMALUS	POA
NODDING ONION	ALLIUM CERNUUM	LIL
NUTTALL'S VIOLET	VIOLA NUTTALLII	VIO
ONE-SIDED WINTERGREEN	PYROLA SECUNDA	ERI
OREGON GRAPE	MAHONIA REPENS	BER
PALE VETCHLING	LATHYRUS OCHROLEUCUS	FAB
PAPER BIRCH	BETULA PAPYRIFERA	BET
PASQUEFLOWER	ANEMONE PATENS	RAN
PEARLGRASS	POLYGALA ALBA	PGL
PELLITORY	PARIETARIA PENNSYLVANICA	URT
PENNYCRESS	THLASPI ARVENSE	BRA
PIGWEED	AMARANTHUS SPP.	AMA
PINEAPPLE WEED	MATRICARIA MATRICARIOIDES	AST
PINK AVENS	GEUM TRIFLORUM	ROS
PINK CURRANT	RIBES CEREUM	GRS
PINK PHLOX	PHLOX ALYSSIFOLIA	PLM
PLAINS MUHLY	MUHLENBERGIA CUSPIDATA	POA
PLAINS PRICKLY PEAR	OPUNTIA POLYACANTHA	CAC
PLAINS WALLFLOWER	ERYSIMUM ASPERUM	BRA
POISON IVY	TOXICODENDRON RYDBERGII	ANA
PONDEROSA PINE	PINUS PONDEROSA	PIN
PORCUPINE GRASS	STIPA SPARTEA	POA
POVERTY OATGRASS	DANTHONIA SPICATA	POA
PRAIRIE CINQUEFOIL	POTENTILLA PENNSYLVANICA	ROS
PRAIRIE CONEFLOWER	RATIBIDA COLUMNIFERA	AST
PRAIRIE DANDELION	NOTHOCALAIS CUSPIDATA	AST
PRAIRIE DROPSEED	SPOROBOLUS HETEROLEPIS	POA
PRAIRIE GOLDENPEA	THERMOPSIS RHOMBIFOLIA	FAB
PRAIRIE PEPPERGRASS	LEPIDIUM DENSIFLORUM	BRA
PRAIRIE ROCKET	ERYSIMUM ASPERUM	BRA
PRAIRIE ROSE	ROSA ARKANSANA	ROS
PRAIRIE SAGE	ARTEMISIA LUDOVICIANA	AST
PRAIRIE SMOKE	GEUM TRIFLORUM	ROS
PRAIRIE THREE-AWN	ARISTIDA LONGISETA	POA
PRAIRIE WEDGEGRASS	SPHENOPHOLIS OBTUSATA	POA
PRICKLY LETTUCE	LACTUCA SERRIOLA	AST
PRICKLY LETTUCE	LACTUCA SERRIOLA	AST
PROSTRATE SPURGE	EUPHORBIA SPP.	EUP
PROSTRATE VERVAIN	VERBENA BRACTEATA	VRB
PUCCOON	LITHOSPERMUM INCISUM	BOR
PURPLE ASTER	ASTER LAEVIS	AST

PURPLE ASTER	ASTER OBLONGIFOLIUS	AST
PURPLE ASTER	MACHAERANTHERA LINEARIS	AST
PURPLE CLEMATIS	CLEMATIS COLUMBIANA	RAN
PURPLE CLIFF BRAKE	PELLAEA ATROPURPUREA	PLP
PURPLE CONEFLOWER	ECHINACEA PALLIDA	AST
PURPLE FLEABANE	ERIGERON SPP.	AST
PURPLE LOCO	OXYTROPIS LAMBERTII	FAB
PURPLE PRAIRIE CLOVER	PETALOSTEMON PURPUREUM	FAB
PURPLESPOT LILY	FRITILLARIA ATROPURPUREA	LIL
PUSSYTOES	ANTENNARIA SPP.	AST
QUACKGRASS	AGROPYRON REPENS	POA
QUAKING ASPEN	POPULUS TREMULOIDES	SAL
RABBITBRUSH	CHRYSOTHAMNUS NAUSEOSUS	AST
RAGWEED	AMBROSIA SPP.	AST
RAGWORT	SENECIO SPP.	AST
RED CLOVER	TRIFOLIUM PRATENSE	FAB
RED-OSIER DOGWOOD	CORNUS STOLONIFERA	COR
REDTOP BENT	AGROSTIS STOLONIFERA	POA
RICHARDSON NEEDLEGRASS	STIPA RICHARDSONII	POA
ROCK JASMINE	ANDROSACE SEPTENTRIONALIS	PRM
ROCKCRESS	ARABIS SPP.	BRA
ROCKY MOUNTAIN IRIS	IRIS MISSOURIENSIS	IRI
ROCKY MOUNTAIN JUNIPER	JUNIPERUS SCOPULORUM	CUP
ROCKY MOUNTAIN SPURGE	EUPHORBIA ROBUSTA	EUP
ROSEY PUSSYTOES	ANTENNARIA ROSEA	AST
ROUGH BLUEGRASS	POA TRIVIALIS	POA
ROUGHLEAF RICEGRASS	ORYZOPSIS ASPERIFOLIA	POA
RUSH	JUNCUS SPP.	JUN
RUSSET BUFFALOBERRY	SHEPHERDIA CANADENSIS	ELE
RUSSIAN OLIVE	ELEAGNUS ANGUSTIFOLIA	ELE
RUSSIAN THISTLE	SALSOLA KALI	CHE
SAGE	SALVIA REFLEXA	LAM
SALTGRASS	DISTICHLIS SPICATA	POA
SAND DROPSEED	SPOROBOLUS CRYPTANDRUS	POA
SAND LILY	LEUCOCRINUM MONTANUM	LIL
SANDBERG BLUEGRASS	POA SANDBERGII	POA
SANDWORT	ARENARIA LATERIFLORA	CAR
SATINGRASS	MUHLENBERGIA RACEMOSA	POA
SCARLET GAURA	GAURA COCCINEA	ONA
SCARLET GLOBEMALLOW	SPHAERALCEA COCCINEA	MAL
SCOURING RUSH	EQUISETUM LAEVIGATUM	EQU
SCRATCHGRASS	MUHLENBERGIA ASPERIFOLIA	POA
SEDGE	CAREX SPP.	CYP
SEGO LILY	CALOCHORTUS GUNNISONII	LIL
SELF-HEAL	PRUNELLA VULGARIS	LAM
SERVICEBERRY	AMELANCHIER ALNIFOLIA	ROS
<u>SHEEP FESCUE</u>	FESTUCA OVINA	POA
SHEPHERDS PURSE	CAPSELLA BURSA-PASTORIS	BRA
SHOOTING STAR	DODECATHEON PULCHELLUM	PRM
SHOWY GAYFEATHERS	LIATRIS LIGULISTYLUS	AST
SHOWY MILKWEED	ASCLEPIAS SPECIOSA	ASC
SHRUBBY CINQUEFOIL	POTENTILLA FRUTICOSA	ROS
SIDEOATS GRAMA	BOUTELOUA CURTIPENDULA	POA
SILVER SAGEBRUSH	ARTEMISIA CANA	AST
SILVERLEAF BUFFALOBERRY	SHEPHERDIA ARGENTEA	ELE

SILVERLEAF SCURFPEA	PSORALEA ARGOPHYLLA	FAB
SKELETONWEED	LYGODESMIA JUNCEA	AST
SKUNKBUSH	RHUS TRILOBATA	ANA
SLENDER WHEATGRASS	AGROPYRON TRACHYCAULUM	POA
SLIMFLOWER SCURFPEA	PSORALEA TENUIFLORA	FAB
SMOOTH BROME	BROMUS INERMIS	POA
SNAKEROOT	SANICULA MARILANDICA	API
SNOWBERRY	SYMPHORICARPOS SPP.	CPR
SOW-THISTLE	SONCHUS ASPER	AST
SPANISH BAYONET	YUCCA GLAUCA	LIL
SPEEDWELL	VERONICA AMERICANA	SCR
SPIKERUSH	ELEOCHARIS PALUSTRIS	CYP
SPOTTED CORALROOT ORCHID	CORALLORHIZA MACULATA	ORC
SQUAWBUSH	RHUS TRILOBATA	ANA
STAR LILY	LEUCOCRINUM MONTANUM	LIL
STEMLESS DAISY	TOWNSENDIA HOOKERI	AST
STEMLESS HYMENOXYS	HYMENOXYS ACAULIS	AST
STICKSEED	LAPPULA SQUARROSA	BOR
STICKSEED	HACKELIA DEFLEXA	BOR
STINGING NETTLES	URTICA DIOICA	URT
STINKGRASS	ERAGROSTIS CILIANENSIS	POA
STONECROP	SEDUM LANCEOLATUM	CRS
SULPHUR PAINTBRUSH	CASTILLEJA SULPHUREA	SCR
SUMMER CYPRESS	KOCHIA SCOPARIA	CHE
SUNFLOWER	HELIANTHUS SPP.	AST
SWEET CICELY	OSMORHIZA DEPAUPERATA	API
SWEETGRASS	HIEROCHLOE ODORATA	POA
SWEETVETCH	HEDYSARUM ALPINUM	FAB
SWITCHGRASS	PANICUM VIRGATUM	POA
TALL WHEATGRASS	AGROPYRON ELONGATUM	POA
TANSYMUSTARD	DESCURAINIA SPP.	BRA
THELESERMA	THELESERMA MEGAPOTAMICUM	AST
TIMBER OATGRASS	DANTHONIA INTERMEDIA	POA
TIMOTHY	PHLEUM PRATENSE	POA
TOBACCO-ROOT	VALERIANA EDULIS	VAL
TREACLE MUSTARD	ERYSIMUM CHEIRANTHOIDES	BRA
TUMBLEGRASS	SCHEDONNARDUS PANICULATUS	POA
TUMBLEMUSTARD	SISYMBRIUM ALTISSIMUM	BRA
TUMBLEWEED	SALSOLA KALI	CHE
TURKEYFOOT	ANDROPOGON GERARDII	POA
TWINFLOWER	LINNAEA BOREALIS	CPR
VERONICA	VERONICA AMERICANA	SCR
VIRGINS BOWER	CLEMATIS LIGUSTICIFOLIA	RAN
WALLFLOWER	ERYSIMUM INCONSPICUUM	BRA
WAVY LEAVED THISTLE	CIRSIIUM UNDULATUM	AST
WESTERN WHEATGRASS	AGROPYRON SMITHII	POA
WESTERN YARROW	ACHILLEA MILLEFOLIUM	AST
WHEATGRASS	AGROPYRON ALBICANS	POA
WHITE ASTER	ASTER FALCATUS	AST
WHITE CAMPION	LYCHNIS ALBA	CAR
WHITE CLOVER	TRIFOLIUM REPENS	FAB
WHITE FLEABANE	ERIGERON SPP.	AST
WHITE GOLDENROD	SOLIDAGO PTARMICOIDES	AST
WHITE LOCO	OXYTROPIS SPP.	FAB
WHITE PENSTEMON	PENSTEMON ALBIDUS	SCR

WHITE PHLOX	PHLOX HOODII	PLM
WHITE PRAIRIE CLOVER	PETALOSTEMON OCCIDENTALE	FAB
WHITE SWEETCLOVER	MELILOTUS ALBA	FAB
WHITETOP	THLASPI ARVENSE	BRA
WHITLOW WORT	PARONYCHIA SESSILIFLORA	CAR
WILD BERGAMOT	MONARDA FISTULOSA	LAM
WILD CROCUS	ANEMONE PATENS	RAN
WILD GERANIUM	GERANIUM RICHARDSONII	GER
WILD LETTUCE	LACTUCA SPP.	AST
WILD LICORICE	GLYCYRRHIZA LEPIDOTA	FAB
WILD LILY-OF-THE-VALLEY	SMILACINA STELLATA	LIL
WILD MINT	MENTHA ARVENSIS	LAM
WILD ONION	ALLIUM GEYERI	LIL
WILD ONION	ALLIUM TEXTILE	LIL
WILD RASPBERRY	RUBUS IDAEUS	ROS
WILD ROSE	ROSA ACICULARIS	ROS
WILD STRAWBERRY	FRAGARIA VIRGINIANA	ROS
WILD SWEETPEA	LATHYRUS OCHROLEUCUS	FAB
WILD VETCH	VICIA AMERICANA	FAB
WILD RYE	ELYMUS VILLOSUS	POA
WILLOWHERB	EPILOBIUM CILIATUM	ONA
WINDFLOWER	ANEMONE CYLINDRICA	RAN
WINDFLOWER	ANEMONE MULTIFIDA	RAN
WINTERGREEN	PYROLA CHLORANTHA	ERI
WITCHGRASS	PANICUM CAPILLARE	POA
WOOD LILY	LILIUM PHILADELPHICUM	LIL
WOOD SORREL	OXALIS DILLENII	OXL
WOOD'S ROSE	ROSA WOODSII	ROS
WOOLLY INDIANWHEAT	PLANTAGO PATAGONICA	PTG
WOOLLY VERBENA	VERBENA STRICTA	VRB
WOUNDWORT	STACHYS PALUSTRIS	LAM
YELLOW AVENS	GEUM ALEPPICUM	ROS
YELLOW EVENING PRIMROSE	OENOTHERA VILLOSA	ONA
YELLOW FLAX	LINUM RIGIDUM	LIN
YELLOW OWLS CLOVER	ORTHOCARPUS LUTEUS	SCR
YELLOW SWEETCLOVER	MELILOTUS OFFICINALIS	FAB
YELLOW VIOLET	VIOLA NUTTALLII	VIO
YUCCA	YUCCA GLAUCA	LIL

WILDFLOWER CHECKLIST,
JEWEL CAVE NATIONAL MONUMENT

H. MARRIOTT
1985

WHITE

BALL-HEAD GILIA
BANEBERRY
BASTARD TOADFLAX
BISCUIT ROOT
CAMPION
CANADIAN VIOLET
CHICKWEED
COW PARSNIP
CREEPING JENNY
DEATH CAMAS
DRABA
DWARF MILKWEED
EDIBLE VALERIAN
ELLISIA
EVENING PRIMROSE
FAIRY BELLS
FALSE BONESET
FALSE GROMWELL
FALSE SOLOMON SEAL
FIELD BINDWEED
GREENBRIAR
GROUND PLUM
HARE'S EAR
HOREHOUND
KITTENTAIL
LOCOWEED
MEADOW PARSNIP
MILKWEED
MILKWORT
MOUNTAIN DEATH CAMAS
MOUNTAIN MILKWORT
ONE-SIDED WINTERGREEN
PEARLGRASS
PENNYCRESS
PUSSYTOES
SAND LILY
SANDWORT
SEGO LILY
SHEPHERDS PURSE
SPANISH BAYONET
STAR LILY
TOBACCO-ROOT
VIRGINS BOWER
WESTERN YARROW
WHITE ASTER
WHITE CAMPION
WHITE CLOVER
WHITE FLEABANE
WHITE GOLDENROD
WHITE LOCO
WHITE PENSTEMON
WHITE PHLOX
WHITE PRAIRIE CLOVER

WHITE SWEETCLOVER
WHITETOP
WILD GERANIUM
WILD LICORICE
WILD LILY-OF-THE-VALLEY
WILD ONION
WILD STRAWBERRY
WINDFLOWER
WINTERGREEN
WOOLLY INDIANWHEAT
YUCCA

YELLOW

ALUMROOT
ALYSSUM
BISCUIT ROOT
BLACK MEDIC
BLACK-EYED SUSAN
BLADDERPOD
BLANKET FLOWER
BRITTLE PRICKLY PEAR
BROOMWEED
BUFFALO BUR
BUTTERCUP
CANADIAN GOLDENROD
CINQUEFOIL
CUTLEAF
DANDELION
· DOWNY PAINTED CUP
FALSEFLAX
FETID MARIGOLD
FRINGED LOOSESTRIFE
GAILLARDIA
GOLDEN ASTER
GOLDEN CORYDALIS
GOLDENBANNER
GOLDENROD
GOLDENWEED
GROMWELL
GROUNDCHERRY
GROUNDSEL
GUMWEED
HEART-LEAVED ALEXANDERS
HENBANE
HOLLY GRAPE
MATCHBRUSH
MEADOW PARSNIP
MEADOW SALSIFY
MISSOURI GOLDENROD
MISSOURI PINCUSHION
MOUNTAIN DANDELION
MULLEIN
MUSINEON
NUTTALL'S VIOLET

OREGON GRAPE
PALE VETCHLING
PINEAPPLE WEED
PLAINS PRICKLY PEAR
PLAINS WALLFLOWER
POISON IVY
PRAIRIE CINQUEFOIL
PRAIRIE CONEFLOWER
PRAIRIE DANDELION
PRAIRIE GOLDENPEA
PRAIRIE ROCKET
PRICKLY LETTUCE
PUCCOON
RAGWORT
SOW-THISTLE
STEMLESS HYMENOXYS
STONECROP
SULPHUR PAINTBRUSH
SUNFLOWER
TANSYMUSTARD
THELESPERMA
TREACLE MUSTARD
TUMBLEMUSTARD
WALLFLOWER
WILD SWEETPEA
WOOD SORREL
YELLOW AVENS
YELLOW EVENING PRIMROSE
YELLOW FLAX
YELLOW OWLS CLOVER
YELLOW SWEETCLOVER
YELLOW VIOLET

BLUE

ALFALFA
BLUE COLUMBINE
BLUE FLAX
BLUE LIPS
BLUE PENSTEMON
BLUE VIOLET
BLUE-EYED GRASS
BLUE-EYED MARY
BLUEBELLS
BOG VIOLET
BREADROOT SCURFPEA
DRABA LOCOWEED
GIANT HYSSOP
HAREBELL
LARKSPUR
LOBELIA
LUPINE
PRICKLY LETTUCE
PROSTRATE VERVAIN
ROCKY MOUNTAIN IRIS

SAGE
SILVERLEAF SCURFPEA
SLIMFLOWER SCURFPEA
SPEEDWELL
STICKSEED
STICKSEED
VERONICA
WILD LETTUCE
WILD MINT

PURPLE

BLAZINGSTAR
BULL THISTLE
CANADA THISTLE
CRESTED BEARDTONGUE
GAYFEATHERS
HORSEMINT
HOUNDSTONGUE
LOCOWEED
MISSOURI LOCOWEED
PASQUEFLOWER
PURPLE ASTER
PURPLE ASTER
PURPLE ASTER
PURPLE CLEMATIS
PURPLE CONEFLOWER
PURPLE FLEABANE
PURPLE LOCO
PURPLE PRAIRIE CLOVER
PURPLESPOT LILY
SHOWY GAYFEATHERS
WAVY LEAVED THISTLE
WILD BERGAMOT
WILD CROCUS
WILD VETCH
WOOLLY VERBENA

PINK

ALSIKE CLOVER
BURDOCK
BUTTERFLY WEED
CANCERROOT
CORONILLA
DOGBANE
DRAGONHEAD
FALSE PENNYROYAL
FIREWEED
FOUR O'CLOCK
HEDGENETTLE
KINNIKINNIK
MOTHERWORT
NODDING ONION
PINK AVENS

PINK PHLOX
PRAIRIE ROSE
PRAIRIE SMOKE
RED CLOVER
ROCKCRESS
ROSEY PUSSYTOES
SCARLET GAURA
SELF-HEAL
SHOOTING STAR
SHOWY MILKWEED
SKELETONWEED
SPOTTED CORALROOT ORCHID
STEMLESS DAISY
SWEETVETCH
TWINFLOWER
WILD ONION
WILLOWHERB
WOUNDWORT

RED/ORANGE

FIGWORT
HONEYSUCKLE
SCARLET GLOBEMALLOW
WINDFLOWER
WOOD LILY

GREEN/INCONSPICUOUS

AMARANTH
BEDSTRAW
CATTAIL
COMMON PLANTAIN
CUDWEED SAGEWORT
DOCK
FRINGED SAGEBRUSH
GOOSEFOOT
GREEN BOG ORCHID
GREEN GENTIAN
HOPS
HORSEWEED
IVA
KNOTWEED
LAMBS QUARTERS
LEAFY SPURGE
MEADOW RUE
PELLITORY
PIGWEEED
PRAIRIE PEPPERGRASS
PRAIRIE SAGE
PROSTRATE SPURGE
RAGWEED
ROCK JASMINE
ROCKY MOUNTAIN SPURGE
RUSSIAN THISTLE

SNAKEROOT
STINGING NETTLES
SUMMER CYPRESS
SWEET CICELY
TUMBLEWEED
WHITLOW WORT

SHRUBS AND TREES OF
JEWEL CAVE NATIONAL MONUMENT

SHRUBS

BLACK CURRANT
COMMON JUNIPER
FALSE TARRAGON
GOLDEN CURRANT
GOOSEBERRY
MOUNTAIN MAHOGANY
NINEBARK
PINK CURRANT
RABBITBRUSH
RUSSET BUFFALOBERRY
SHRUBBY CINQUEFOIL
SILVER SAGEBRUSH
SKUNKBUSH
SNOWBERRY
SQUAWBUSH
WILD RASPBERRY
WILD ROSE
WOOD'S ROSE

TREES

BOXELDER
CHOCHECHERRY
JUNEBERRY
PAPER BIRCH
PONDEROSA PINE
QUAKING ASPEN
RED-OSIER DOGWOOD
ROCKY MOUNTAIN JUNIPER
RUSSIAN OLIVE
SERVICEBERRY
SILVERLEAF BUFFALOBERRY

from Soil Conservation Service preliminary
maps (summer, 1985)

49C

32E

1440

32E

32E

49C

32E

144C

49F

32E

SAWDUST-VANOCKER ASSOCIATION

33F

ROCK OUTCROP-SAWDUST COMPLEX

49C

VANOCKER-PAUNSAUGUNT COMPLEX

49F

VANOCKER-SAWDUST-ROCK OUTCROP COMPLEX

COMPLEX

0045

MONUMENT

JEWEL CAVE

VEGETATION OF

inches thick, is brown, firm channery clay loam in the upper part and pale brown, friable, calcareous, channery clay loam in the lower part. The underlying material, to a depth of 60 inches, is very pale brown, flaggy calcareous loam. In places, similar soils have bedrock between 20 and 40 inches.

\$I01Included with these soils in mapping are small areas of Citadel, Hilger, and Paunsaugunt soils. The Citadel soils do not have rock fragments in the subsoil, contain more clay and occur on lower parts of the landscape. The Hilger soils have cobbles of different origins throughout and occur on old outwash terraces. The Paunsaugunt soils are shallow to bedrock and are intermingled throughout the unit. Included are Rock outcrops which occur as bare slabs lying parallel to the slope and thin ledges at the crest of a slope. Also included are soils with large boulders on the surface. These occur below the rock ledges.

\$I01Available water capacity is low in the Sawdust soil and moderate in the Vanocker soil. Permeability is moderate in both soils. Runoff is medium or rapid.

\$I01This unit is in forest and used mainly for timber production. The overstory is dominantly ponderosa pine. The Sawdust soils on the southern and western slopes have open stands of timber. Vanocker soils on the northern and eastern slopes have fairly dense stands of timber. Site index for ponderosa pine on this unit is about 50 for Sawdust soil and

Descriptions of soils units & accompanying
soils overlay

\$I1032H Sawdust-Vanocker Association, 10 to 40 percent slopes.

\$T1 This map unit consists of deep to fractured bedrock, well drained soils on uplands. It is formed in materials derived from sedimentary rocks on the lower Limestone Plateau. It is on strongly sloping to hilly areas including ridges and mountain side slopes. Elevations range from 3,500 to 6,200 feet. Annual precipitation ranges from 16 to 20 inches. Areas of these soils are 80 to several thousand acres in size and are irregular in shape. They are about 45 to 55 percent Sawdust soils and 35 to 45 percent Vanocker soils. The Sawdust soils occur on landscapes that have a southerly aspect. The Vanocker soils generally occur on landscapes that have a northerly aspect. The uses of this unit are such that separate mapping of the larger areas of Rockerville soils and of the minor soils is not practical.

\$I01 Typically, the surface layer of the Sawdust soil is dark grayish brown, calcareous, channery loam about 4 inches thick. The transition layer, about 4 inches thick, is pale brown, calcareous, very channery loam. The underlying material, to a depth of 60 inches, is light yellowish brown, calcareous, very channery loam in the upper part, very pale brown, calcareous, extremely channery loam in the middle and yellow, calcareous, extremely channery sandy loam in the lower part. In places, similar soils have more sand and less clay.

\$I01 Typically, the surface layer of the Vanocker soil is brown channery loam about 2 inches thick. The subsoil, about 11

\$I1033FeRock outcrop-Sawdust complex, 40 to 80 percent slopes.
\$T1This map unit consists of Rock outcrops and deep, well drained soils on uplands. It is formed in materials derived from sedimentary rocks on the lower Limestone Plateau. It is on very steep side slopes of mountain canyons. Slopes are generally more than 500 feet long and smooth with ledges of rimrock outcrops breaking the plane of the slope. Elevations range from 3,000 to 6,200 feet. Annual precipitation ranges from 16 to 20 inches. Areas of this unit are 80 to several hundred acres in size and long and narrow in shape. They are about 40 to 50 percent Rock outcrop and 35 to 45 percent Sawdust soils. The Rock outcrops areas range in size from less than 1 acre to 5 acres. They generally occur on the upper parts of the landscape on slopes with northerly aspects and on all parts of the landscape on slopes with southerly aspects. The Sawdust soils are on the mid and lower parts of the landscape. Since the two components of this unit are intermingled and because the unit has limited use, separating the components in mapping is not practical.

\$I01Rock outcrop consists of exposure of very pale brown, hard fractured limestone in the form of continuous rimrock ledges. In many areas, weathering has caused rock slides below outcrops, sometimes completely covering the soil.

\$I01Typically, the surface layer of the Sawdust soil is dark grayish brown, calcareous, channery loam about 4 inches thick. The transition layer, about 4 inches thick, is pale brown,

about 60 for Vanocker soil. Potential erosion hazard on disturbed areas is moderate to severe.

\$I01This unit is fairly well suited for woodland grazing where the timber canopy is sparse. The dominant grass species on the Sawdust soil are little bluestem, needleandthread and sedges.

Grass species on the Vanocker soil are poverty oatgrass, bluegrass, bearded wheatgrass and sedges. The dominant shrub species on Sawdust soil are snowberry, russett buffaloberry and common

juniper. Shrub species on Vanocker soil are bearberry, Oregon grape, snowberry, russett buffaloberry and common juniper.

\$I01Care must be taken in selecting sites for buildings and septic tank absorption fields. Slopes of 10 to 15 percent are fairly well suited for these uses and the steeper slopes of this unit are poorly suited. Effluent from absorption fields on steeper slopes could seep laterally and surface in downhill areas. Using a septic system other than the conventional type may be necessary to adequately dispose of the effluent. This unit is fairly well suited for unsurfaced roads.

\$I01This unit is in capability Unit VIe-13. The Sawdust soil is in Grazable Woodland group _____ and the Vanocker soil is in Grazable Woodland group _____.

areas of the unit may be suited for cable logging systems. The site index for ponderosa pine is about 40. Potential erosion hazard on disturbed areas is severe.

\$I01This unit has very limited use for woodland grazing due to the Rock outcrop and steep slopes. Forage utilization on the steep slopes is mainly by woodland wildlife. The dominant grass species are little bluestem and sideoats grama. Shrub species are mainly russett buffaloberry and yucca. Some mountain mahogany occurs on this unit in the Hell Canyon and Redbird Canyon areas.

\$I01This unit is poorly suited for unsurfaced roads, building sites and septic tank absorption fields due to the steepness of the slopes and rock outcrop. Soil slippage and rock slides can occur in disturbed areas. Some landslide areas may be present but were not identified during soils mapping.

\$I01Sawdust soil is in Capability Unit VIIe-9. Rock outcrop is in Capability Unit VIIIs-1. The map unit is not placed in a grazable woodland group.

calcareous, very channery loam. The underlying material, to a depth of 60 inches, is light yellowish brown, calcareous very channery loam in the upper part, very pale brown, calcareous, extremely channery loam in the middle and yellow, calcareous, extremely

channery sandy loam in the lower part. Similar soils have more clay in the subsoil. Also in some places, similar soils have more sand and less clay.

\$I01Included with this unit in mapping are small areas of Paunsaugunt, Vanocker and Winetti soils. The Paunsaugunt soils are shallow to bedrock and are intermingled throughout the unit. Vanocker soils have a lighter colored surface layer and have more clay in the subsoil than Sawdust. Vanocker soils occur on northern slopes. Winetti soils have more sand and gravel than Sawdust soils and occur on floodplains along drainageways in mountain valleys. These soils make up less than 15 percent of any one mapped area.

\$I01The Sawdust soil has moderate permeability and low available water capacity. Runoff is medium or rapid on the Sawdust soil. It is very rapid on the Rock outcrop areas.

\$I01Ponderosa pine is the dominant timber species on this unit. However, some areas in Dark Canyon along Rapid Creek have sparse or no trees. Size and density of trees increase on slopes that have a northerly aspect. The Rock outcrop and steep slopes will restrict use of crawler and wheeled skidding equipment. Some

material is light brown limestone. Similar soils are underlain by limy sandstone in the southwestern part of the survey area.

\$I01Included with this unit in mapping are small areas of Citadel and Gurney soils and Rock outcrop. The Citadel soil has more clay, less coarse fragments and is in the slight depressions of the landscape. The Gurney soil has bedrock at depths of 20 to 40 inches and occurs in the open meadows. The Rock outcrop occurs as exposed flat slabs on the broad ridges and as low relief ledges on the steeper parts of the landscape. The components make up less than 15 percent of any one mapped area.

\$I01Permeability and available water capacity are moderate in the Rockerville soil. The Paunsaugunt soil has moderate permeability above the limestone and very low available water capacity. Runoff is medium or rapid.

\$I01This unit is in forest and used mainly for timber production. The overstory is dominantly ponderosa pine. The Vanocker soils have fairly dense stands of timber. The shallow Paunsaugunt soils usually have sparse stands of timber. Site index for ponderosa pine on this unit is about 60 for Vanocker soil and about 40 for Paunsaugunt soil. Potential erosion hazard on disturbed areas is slight.

\$I01This unit is well suited for woodland grazing where the timber canopy is sparse. The dominant grass species are poverty

\$I1049C Vanocker-Paunsaugunt complex, 2 to 15 percent slopes.

\$T1 This map unit consists of deep and shallow, well drained and somewhat excessively drained soils on uplands. It is on gently sloping to strongly sloping sides of ridges and broad areas of divides of the Limestone Plateau. The soils formed in material derived from limestone and sandstone. Elevations range from 3,500 to 6,200 feet. Annual precipitation ranges from 16 to 20 inches. Mapped areas are 10 to several hundred acres in size and irregular in shape. They are about 50 to 60 percent Vanocker soils and 25 to 35 percent Paunsaugunt soils. These soils occur in similar positions, however, the Paunsaugunt soil is associated with limestone outcrops. These soils are so intermingled that it is not practical to separate them in mapping.

\$I01 Typically, the surface layer of the Vanocker soil is brown, channery loam about 2 inches thick. The subsoil, about 11 inches thick, is firm, brown, channery clay loam in the upper part and pale brown, friable, calcareous, channery clay loam in the lower part. The underlying material, to a depth of 60 inches, is very pale brown, flaggy calcareous loam. In places, similar soils have bedrock between 20 and 40 inches.

\$I01 Typically, the surface layer of the Paunsaugunt soil is about 11 inches thick. It is dark brown, calcareous gravelly loam in the upper part and grayish brown, calcareous, very friable gravelly loam in the lower part. The underlying

\$11049F Vanocker-Sawdust-Rock outcrop complex, 40 to 80 percent slopes. \$T1 This map unit consists of deep, well drained soils and Rock outcrops on uplands. It is on very steep mountain sideslopes of the Limestone Plateau. The soils formed in material derived from sandstone and limestone. Elevations range from 3,500 to 6,200 feet. Annual precipitation ranges from 18 to 22 inches. Mapped areas are 40 to 400 acres in size and long and narrow in shape, and generally encompassing a canyon. The slopes are generally less than 500 feet long, with Vanocker soil on the northerly facing slopes and Sawdust on the southerly facing slopes. The Rock outcrop is near the upper parts of the landscape, occurring as large ledges or blocks that are discontinuous. The Vanocker soil makes up about 40 to 50 percent, Sawdust soil about 25 to 35 percent and Rock outcrop about 10 to 20 percent of the unit. It is not practical to separate the components in mapping as the unit has limited use.

\$I01 Typically, the surface layer of the Vanocker soil is brown, channery loam about 2 inches thick. The subsoil, about 11 inches thick, is brown, channery clay loam in the upper part and pale brown, channery clay loam in the lower part. The underlying material, to a depth of 60 inches, is very pale brown, flaggy loam. In places, similar soils have bedrock between 20 and 40 inches.

\$I01 Typically, the surface layer of the Sawdust soil is dark grayish brown, channery loam about 4 inches thick. The transition layer, about 4 inches thick, is pale brown, very

oatgrass, bearded wheatgrass, bluegrass and sedges. Shrub species are Oregon grape, bearberry, russett buffaloberry, snowberry and common juniper.

\$I01The Vanocker soil is fairly well suited for building sites, septic tank absorption fields and unsurfaced roads. The Paunsaugunt soil is poorly suited for these uses as bedrock is at depths of 10 to 20 inches.

\$I01Vanocker soil is in capability unit VIe-13, Grazeable, Woodland range site; Paunsaugunt soil in capability unit VIIs-1, Grazeable Woodland range site.

areas of the unit may be suited for cable logging systems. The site index for ponderosa pine on this unit is about 55 for Vanocker soil and about 40 for Sawdust soil. Potential erosion hazard on disturbed areas is severe.

\$I01This unit has very limited use for woodland grazing due to the steep slopes and Rock outcrop. Forage utilization on the steep slopes is mainly by woodland wildlife. The dominant grass species on Rockerville soil are poverty oatgrass, bearded wheatgrass, bluegrasses and sedges. Grass species on the Sawdust soil are little bluestem, needleandthread and sedges.

Shrub

species are russett buffaloberry, common juniper, common snowberry, Oregon grape and bearberry.

\$I01This unit is poorly suited for unsurfaced roads, building sites, and septic tank absorption fields due to steep slopes and the Rock outcrops. Soil slippage and rock slides can occur in disturbed areas. Some landslides may be present in this unit, but were not identified during mapping.

\$I01Capability unit is VIIe-9, Rock outcrop is capability unit VIIIs-1; not placed in a Grazable Woodland range site.

channery loam. The underlying material, to a depth of 60 inches, is light yellowish brown, very channery loam in the upper part, very pale brown, extremely channery loam in the middle and yellow, extremely channery sandy loam in the lower part. In places, similar soils have more sand and less clay.

\$I01Rock outcrop consists of exposure of very pale brown, hard fractured limestone in the form of discontinuous rimrock ledges. In many areas, weathering has caused rock slides below outcrops.

\$I01Included with this unit in mapping are small areas of Citadel and Cordeston soils along the very narrow valley bottoms and on the toeslopes. The Citadel soils have more clay in the subsoil than Vanocker soils. The Cordeston soils are in the open, grassy parks and contain fewer coarse fragments than the Vanocker soils. These soils make up less than 15 percent of any one mapped area.

\$I01Permeability is moderate in both soils. Available water capacity is moderate in the Rockerville and low in the Sawdust soil. Runoff is rapid.

\$I01Ponderosa pine is the dominant timber species on this unit. Vanocker soils on the northerly slopes have fairly dense stands of timber. Sawdust soils on the southerly slopes have open stands of timber. The steep slopes and Rock outcrop will restrict use of crawler and wheeled skidding equipment. Some

grayish brown, calcareous, very cobbly sandy loam in the lower part.

\$I01Included with this soil in mapping are small areas of Barnum and Bullflat soils. The Barnum soils have redder colors and occur in similar positions as the Cordeston soils. The Bullflat soils have less sand and more clay in the subsoil than the Cordeston Variant soil and occur on higher parts of the landscape not subject to flooding.

\$I01The Cordeston soil is high in fertility and content of organic matter. Available water capacity is high and permeability is moderate. Runoff is slow to medium. The Winetti soil is medium in fertility and content of organic matter. Available water capacity is low and permeability is moderate or moderately rapid. Runoff is slow.

\$I01Most of this unit supports native grass and is used for grazing and wildlife habitat. The native vegetation on the Cordeston soil consists of big bluestem, indiangrass, western wheatgrass and blue grama. Overused areas are dominantly by Kentucky bluegrass, sedges and weeds. The native vegetation on the Winetti soil is scattered ponderosa pine, big bluestem, switchgrass and green needlegrass. Overused areas are similar to the species on Cordeston Variant soil.

\$I01This unit is not suited for building sites or septic tank absorption fields unless it is protected from flooding.

\$I101440C Cordeston-Winetti complex, 2 to 9 percent slopes.
\$T1 This unit consists of deep, well drained and somewhat excessively drained, gently sloping to moderately sloping soils on bottom lands usually dissected by a deep channel. It is formed in material derived from calcareous sandstone and limestone in the Limestone Plateau area. Elevation ranges from 4,200 to 6,200 feet. Annual precipitation ranges from 17 to 20 inches. Mapped areas are 10 to 80 acres in size and long in shape. This mapping unit is subject to common flooding for brief periods. They are about 55 to 65 percent Cordeston and 15 to 25 percent Winetti soils. The Cordeston is back from the channel on the higher parts of the landscape. The Winetti soils are adjacent to the channel in the lower parts of the landscape. These soils occur in such narrow patterns that it is not practical to separate them in mapping.

\$I01 Typically, the surface layer of Cordeston is very dark grayish brown, calcareous loam about 20 inches thick. The transition layer, about 12 inches thick, is dark brown, calcareous, very friable loam. The underlying material to a depth of 60 inches, is grayish brown calcareous loam within stratas of coarser textures. Also in places, similar soils have coarse fragments in the lower part.

\$I01 Typically, the surface layer of Winetti soil is dark grayish brown, calcareous cobbly loam about 5 inches thick. The underlying material to a depth of 60 inches is brown, calcareous, very gravelly sandy loam in the upper part and dark



\$I01Unsurfaced roads need to be graded to shed water and may need gravel on the Cordeston soils.

\$I01These soils are in capability unit VIw-1; Overflow range site.