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Vascular Plants of the Desert Experimental Range, Millard County, Utah

by Sherel Goodrich



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RESEARCH SUMMARY

Since the establishment of the Desert Experimental Range in 1933, plant specimens have been collected from the area and deposited in the herbarium of the experimental range. These specimens and duplicate specimens have been sent to botanists acquainted with various groups of plants for annotation. From this collection of annotated specimens, a checklist of vascular plants of the area was assembled. This checklist provided the basis for the taxa covered in this flora.

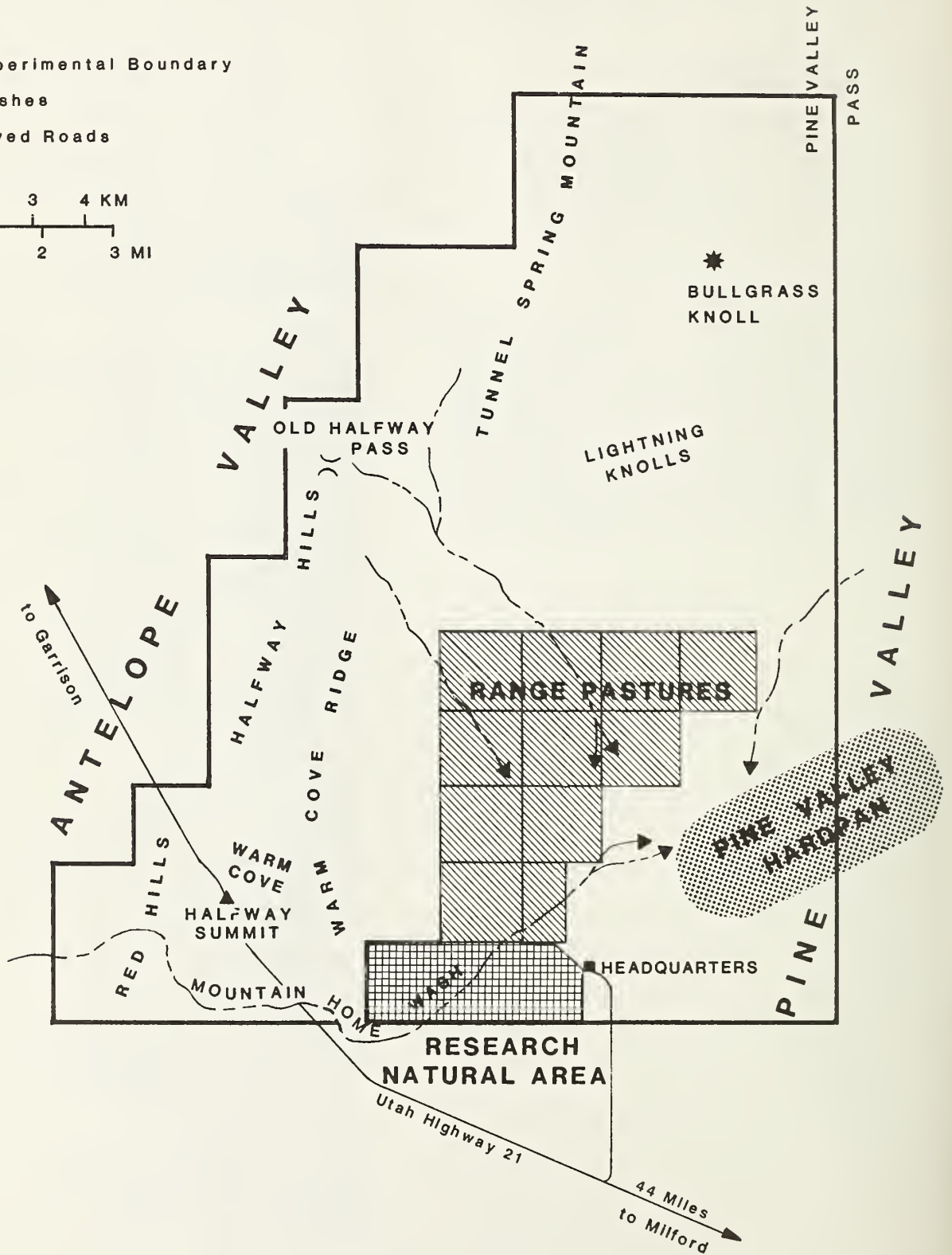
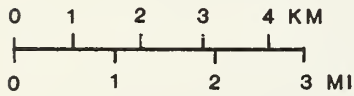
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INTERMOUNTAIN RESEARCH STATION
DESERT EXPERIMENTAL RANGE
 SOUTHWEST MILLARD COUNTY, UTAH

Legend

- Experimental Boundary
- - -> Washes
- Paved Roads



Vascular Plants of the Desert Experimental Range, Millard County, Utah

Sherel Goodrich

SECTION I: THE KEYS

INTRODUCTION

The Desert Experimental Range (DER) of the Intermountain Research Station, Forest Service, U.S. Department of Agriculture, is in southwestern Millard County, UT. It consists of about 22 533 ha (55,680 acres) of valley and mountain land typical of some millions of hectares of the eastern part of the cold desert portion of the Great Basin. Since its establishment in 1933, it has been the scene of a number of studies relating to aspects of range management and ecology. This manual is intended to assist current and future studies on the DER by providing identification of plants that grow there and to offer information about the plants such as distribution and importance on the DER.

The keys, descriptions, and other information given apply to plants of the DER only. Outside the DER, plants of a given taxon may vary considerably from the descriptions here. Descriptions of families and particularly of genera are modified to apply only to their members as found on the area, and this treatment, therefore, will be of limited value outside the DER. This narrow approach is followed to keep the work brief and to facilitate the writing of keys based on vegetative features. Descriptive features listed in the keys to families, genera, and species are usually not repeated in the descriptions, and thus descriptions are mostly incomplete. There are several other works that can be referred to for more detailed descriptions including: Cronquist and others (1972, 1977, 1984) and Welsh (1978 to 1983). These two floras, with current nomenclature, deal with broad regions of the Intermountain West including our local area, but they are at present less than half complete. The keys, descriptions, and illustrations in Munz (1968), Hitchcock and others (1955 to 1969), Abrams (1923 to 1960), and Kearney and Peebles (1969) are helpful, but they were written for regions outside of Utah and hence do not include all the plants of the DER. Nomenclature used in studies during the early years of work at the DER for the most part corresponds to that of Tidestrom (1925). Since Tidestrom's time, numerous nomenclatural changes have been made, and many new taxa of our flora have been described. The U.S. Department of Agriculture (1940 to 1965) supported contributions toward a flora of Nevada, a series by several authors that was never completed. That flora has also been used at the DER, and names in some studies have been taken from it. The lack of a complete flora with modern plant names for the area has been the stimulus for this work, which provides a nearly complete listing of plants of the DER. Also, it is intended to provide a synonymy that includes names used by Tidestrom and perhaps other manuals used for plant identification in the past at the DER. It is hoped that the listing of synonymy will aid in consistent interpretation of data gathered over the years by equating the various names that may have been used for the same plant.

In the course of range studies, it is probably more often than not that the worker needs to identify plants in vegetative, fruiting, or early or late flowering stages. Considerable effort was made to design the keys for work with plant specimens at stages other than anthesis. Vegetative features can be extremely variable, and the keys based on vegetative features should be used with caution. However, because the flora of this limited area is small (about 240 taxa), it is feasible to present a vegetative key, and this then becomes another good reason for restricting the work to plants found within the boundary of the DER. For a final check, one should compare keyed vegetative specimens to herbarium specimens. For the most part, the herbarium of the DER (DERM; Holmgren and others 1981) has an adequate to excellent representation of DER plants.

Many of the specimens there have been examined and annotated by botanists specializing in families or genera found on the DER. The present flora is arranged alphabetically by family, genus, and species without regard to phylogenetic order. Several taxa are listed in the keys with authors but are not listed in the descriptions. This procedure was followed for taxa known only from Headquarters (buildings at the south end of the DER) and for a few taxa from areas near to but outside the boundary of the DER.

Notes on distribution and number of taxa listed are based on many years of experience, but neither the distributions nor the listing should be considered complete. New taxa have been added to the list in almost every year that serious collecting has been attempted. There is no reason to believe that all indigenous plants are included, and future introductions should be expected. Notes on grazing use by domestic livestock are based on winter observations only. Domestic livestock have never been kept on the DER in summer, and summer observations of livestock preference have not been possible.

Occupying part of the north end of Pine Valley and extending westward across hills and mountains into Antelope Valley, the DER contains a variety of habitats in its arid landscape. A number of landforms are typical of Great Basin fault-block physiography. The highlands, from south to north, are the Red Hills of Tertiary acidic volcanic rocks; the Halfway Hills, Warm Cove Ridge, and the higher Tunnel Spring Mountain, of Paleozoic sedimentaries—dolomites, quartzite, and limestone—with scattered, small outliers of volcanics. Bedrock is exposed as cliffs and ledges in the steeper parts of the uplands, and the overlying soil materials are thin in many places. In small basins and topographic pockets, as well as on gentler mountain slopes, the loose material may be much thicker than the depth of root penetration.

Skirting the hills and extending well out into the valleys are gravelly-stony bajadas and alluvial fans with slopes ranging between 2 and 8 percent. The land surfaces are obviously of variable age from Late Pleistocene to Recent. The alluvial slopes are cut up by numerous shallow drainageways (or deeper ones extending outward from the canyons). These "dry washes," with gravelly beds, seldom become running streams. They flow only for short periods (minutes or a few hours) after summer rains of high intensity, going years without any flow at all.

The central valley floors are nearly flat and the soil materials there are fine-gravelly or without gravels. Some parts are outwash plains, areas of current accumulation of sediment. In the lowest part of Pine Valley, a valley without exterior drainage, there is a barren playa, an ephemeral lake known as the Pine Valley Hardpan. It is a summer lake, having water (rarely deeper than a few inches) on part or all of its bed for only a few days or weeks after rainy periods, but not every year. Water escapes by evaporation. During the Pluvial period of Late Pleistocene, Pine Valley contained a much larger lake whose evidence is obvious in gravelly-sandy beach terraces, bars, and spits at various levels on the lower bajadas to an elevation of about 46 m (150 ft) higher than the present dry lake bed. The total elevational range on the DER is almost 1 036 m (3,400 ft), from 1 547 m (5,075 ft) on the Pine Valley Hardpan to 2 578 m (8,457 ft) at the highest point of Tunnel Spring Mountain.

The soils range in texture from sandy loams to loamy sands or sands, most but not all of them gravelly. Except for the playa and some limited areas in its neighborhood, they are mostly very low in clay content. They are classed as aridisols and entisols (Calciorthids, Torrifluvents, Torripsamments, and in a few small areas Natrargids). Almost all are nonsaline in the surface 25- to 38-cm (10- to 15-inch) layers, but many are strongly saline at greater depths.

Winters are cold and summers are warm. January mean temperature is -3.5°C (25.7°F). For July the mean is 23.1°C (73.6°F). The average annual precipitation is about 15.2 cm (6 inches) over most of the DER, with greater amounts, probably as much as 22.9 cm (9 inches), in the higher parts of Tunnel Spring Mountain. The elevational difference is largely due to greater amounts of winter precipitation at the higher altitudes. Monthly averages are highest for July and August, about 1.9 to 2.0 cm (0.75 to 0.80 inch) each. The lowest in winter is between 0.75 and 1.02 cm (0.30 and 0.40 inch) for the months of November, December, January, and February. However, such values are essentially meaningless because any month is likely to be without precipitation or with too little to be effective for plant growth. But over the course of a year the likelihood of effective moisture during some month or other is much greater. Of course, there are extremely dry years and wet (for a desert) years—ranging from 0.4 to 1.9 of average—but never a year in the past 50 without precipitation for at least some plant growth.

Almost every year sufficient soil moisture accumulates over winter to allow the early growing species to start growth in the spring. When the winter has been comparatively dry, these species may not remain active long enough to complete growth through their reproductive phase, unless spring rains occur. Other than during this spring period, when some soil moisture is expected, growth occurs if and when there is sufficient rain to wet the soil to several inches. Approximate times and amounts of precipitation are not predictable; there is not the seasonality of precipitation pattern that a hydrograph of monthly averages would imply.

Some perennial plants respond primarily to warm season moisture and grow with sufficient summer or fall rains. Others respond to the more reliable winter accumulation that permits early spring growth. A few opportunist types take advantage of moisture at both seasons.

Annuals are the extreme case in variability of aspect from year to year. The different species seem to need a moisture-temperature condition at a specific season for germination as well as sufficient moisture subsequently for growth. It is a rare year when all annual species known to be part of the flora are found, and the abundance and vigor of those that are present are also widely variable. Years totally or virtually without winter annuals, without summer annuals, or without any annuals are not uncommon.

A number of perennial plant species of the valley slopes are confined to or within a few feet of dry washes. These usually respond with luxuriant growth after a channel has carried water, and the irrigation effect may show in the following year as well. During the several years between floods, the growth, dependant upon the precipitation received on the site, is much less.

Plant communities on Tunnel Spring Mountain and higher steeper slopes of the area are dominated by singleleaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and littleleaf mountain mahogany (*Cercocarpus intricatus*). Bullgrass (*Elymus ambiguus*), stemless goldenweed (*Haplopappus acaulis*), and rough lomatium (*Lomatium scabrum*) are common associated plants. On Warm Cove Ridge and other hills, pinyon is lacking, juniper is rare, and the mahogany is localized. On these hills black sagebrush (*Artemisia nova*), shadscale (*Atriplex confertifolia*), and other cold desert shrubs are dominant. Greasebush (*Forsellesia nevadensis*) is locally common. Sandberg bluegrass (*Poa secunda*), *Stipa* spp., and Indian ricegrass (*Oryzopsis hymenoides*) are among the common grasses. Forbs are numerous, but among the most common are stemless goldenweed and rough lomatium.

On alluvial fans (referred to in the text as fans) and in valleys, Greene rabbitbrush (*Chrysothamnus greenei*), winterfat (*Ceratoides lanata*), shadscale, Nevada ephedra (*Ephedra nevadensis*), black sagebrush, and other cold desert shrubs are dominant over large areas. Indian ricegrass, sand dropseed (*Sporobolus cryptandrus*), galleta (*Hilaria jamesii*), needle-and-thread (*Stipa comata*), blue grama (*Bouteloua gracilis*), and squirrel-tail (*Sitanion hystrix*) are common grasses. In places, especially under continuous heavy grazing in winter, some of these grasses are dominant. Gooseberryleaf globemallow (*Sphaeralcea grossulariifolia*) is a common forb. Plant species of fans and valleys mix in seemingly endless combinations to form communities that must, for the most part, be a function of soils.

A number of rather narrowly endemic plants are found on the DER. Most of these are found in hills and upper parts of older fans. The Devonian Sevy Dolomite is especially rich in these endemics. The type specimens of *Eriogonum eremicum*, *Lesquerella goodrichii*, *Penstemon concinnis*, and *Penstemon nanus* are from the DER. These are narrow endemics of southwest Millard County and adjacent Beaver County. The type specimen of *Cymopterus basalticus* (from Half Way Station) is most likely from the DER, and the type specimen of *Sphaeralcea caespitosa* is from near the DER. These species are also endemics of about the same distribution as the three taxa listed above. The type specimen of *Atriplex bonnevillensis* is from the area of the Pine Valley Hardpan and possibly from the DER. This plant has rather broad distribution in the Great Basin. *Eriogonum howellianum* and *Haplopappus cervinus* are rather narrow endemics, and *Trifolium andersonii* var. *friscanum* is known only from the San Francisco Mountains and Tunnel Spring Mountain of Millard County. *Cryptantha compacta*, *Machaeranthera grindelioides* var. *depressa*, *Opuntia puchella*, and *Sclerocactus pubispinus* var. *pubispinus* are among the several Great Basin endemics of somewhat broader distribution that are found on the DER.

A number of species of warmer or at least more southern distribution seem to have reached a northern limit in the Utah portion of the Great Basin at or near the DER.

Among them are Bigelow sagebrush (*Artemisia bigelovii*), sixweeks grama (*Bouteloua barbata*), spike pappusgrass (*Enneapogon desvauxii*), *Muhlenbergia arsenei*, Whipple cholla (*Opuntia whipplei*), and desert almond (*Prunus fasciculata*). Just off the DER, Nevada broomsage (*Lepidospartum latisquamum*) and Hall panicum (*Panicum hallii*) reach their northern limit, but have not yet been collected on the area itself.

KEY TO FAMILIES

- 1 Stems with spine-bearing areoles, thickened and filled with spongy, succulent, mucilaginous tissue; leaves lacking or essentially so; flowers showy; petals and stamens numerous (prickly pears and other cacti) CACTACEAE
- 1 Plants not as above in all features
 - 2 Plants shrubs or trees, woody well above ground level or if subshrubs not woody above the base then with spine-tipped twigs; leaves not all basal, not with spinulose margins KEY 1
 - 2 Plants herbaceous above ground level, not spiny or if so then leaves with spinulose or spiny margins (plants with woody bases and basal or nearly all basal leaves are keyed here)
 - 3 Leaves sheathing the stems; perianth reduced to chaffy scalelike bracts or a sac; plants grasses or grasslike
 - 4 Stems jointed, often with hollow internodes, with swollen usually solid nodes; flowers mostly bisexual or pistillate; seed (caryopsis) folded between chaffy bracts (lemma and palea) POACEAE
 - 4 Stems not jointed, solid, nodes not swollen; flowers unisexual, subtended by a single chaffy bract; seed (achene) enclosed in a sac (perigynium) CYPERACEAE
 - 3 Leaves rarely sheathing the stem except in LILIACEAE, and then the perianth well developed and more or less showy
 - 5 Plants with neither scapes nor aboveground stems, without flowers, not producing seed, reproducing by spores borne on the lower side of the ultimate segments of pinnately dissected leaves; leaves more or less tufted on a short underground stem POLYPODIACEAE
 - 5 Plants with scapes or aboveground stems; producing flowers and seeds; leaves compound or simple
 - 6 Key to plants with flowers at or near anthesis KEY 2
 - 6 Keys to plants in vegetative condition or with very young, withered, or fallen flowers (keys not designed for use on basal rosettes, but by keying two or more ways, the keys should be helpful in indicating a few taxa that might be checked in the herbarium)
 - 7 At least some of the lower leaves compound or pinnatifid or palmatifid and cut to the midrib or base KEY 3
 - 7 Leaves entire, toothed or lobed but not cut to the midrib or base
 - 8 Leaves toothed or lobed KEY 4
 - 8 Leaves entire or sometimes very inconspicuously toothed KEY 5

KEY 1: PLANTS WOODY ABOVE THE BASE OR WITH SPINE-TIPPED TWIGS OR BOTH

- 1 Plants indigenous, not restricted to (but sometimes in) cultivation at Headquarters; shrubs and small trees
- 2 Plants evergreen, trees, treelike or occasionally shrubs, mostly over 2 m tall; leaves needlelike or scalelike, with pinelike odor
 - 3 Leaves scalelike, densely crowded and overlapping, appressed to the twigs, appearing as scaly covering on the twigs, less than 1 cm long; seeds borne in rounded berrylike glaucous cones; cones less than 1.5 cm in diameter CUPRESSACEAE
 - 3 Leaves needlelike, spreading, not appressed to the twigs, over 1 cm long; seeds borne in cones with several scales PINACEAE
- 2 Plants either not evergreen or the leaves not with pinelike odor, shrubs
 - 4 At least some of the leaves conspicuously and regularly toothed, lobed, or dissected

- 5 Leaves aromatic with sagebrushlike (camphorlike) odor; densely gray or white pubescent on both sides or pinnately divided to the midrib (*Artemisia*) ASTERACEAE
- 5 Leaves without odor of sagebrush, green, at least not densely gray- or white-pubescent on the upper side, palmately lobed
- 6 Leaves divided to the base into 3-7 linear needlelike segments, at least the lower ones opposite, the linear segments sometimes arranged as whorls of needlelike leaves, plants 10-40 cm tall (*Leptodactylon*) POLEMONIACEAE
- 6 Leaves toothed or lobed, not divided into narrow segments, alternate; plants mostly over 40 cm tall
- 7 Leaves sessile or very gradually tapered into a petiole 1-5 mm long, the blades fan-shaped or wedge-shaped at the base, 3-15 mm long and mostly 5-lobed with lobes entire, or if larger then with some rather pointed teeth; flowers white to cream, or if yellow then the petals 5-9 mm long; fruit an achene, not red ROSACEAE
- 7 Leaf blades abruptly constricted to a petiole, at least some of the petioles over 5 mm long, the blades truncate to cordate at the base; flowers pink, or if yellow the petals only 2-3 mm long; fruit a drupe or berry, red or reddish
- 8 Flowers pink, not appearing before the leaves; petioles pubescent, often glandular, leaf blades with 3-5 rounded lobes, the lobes with several rounded teeth; fruit a berry with more than one seed (*Ribes*) SAXIFRAGACEAE
- 8 Flowers yellow, appearing before the leaves; petioles glabrous; leaf blades variously lobed or toothed; fruit a dry drupe with one seed (*Rhus*) ANACARDIACEAE
- 4 Leaves entire, or inconspicuously and irregularly toothed, or lacking
- 9 Leaves all basal, linear, rigid, swordlike, and evergreen, the margins with exfoliating curled stringlike fibers; flowers showy, 4-6 cm long, pendant AGAVACEAE
- 9 Leaves not all basal, not as above in all other features; flowers smaller
- 10 Leaves and twigs opposite, if leaves lacking then twigs opposite or whorled
- 11 Leaves scalelike, inconspicuous, readily deciduous; twigs whorled, greenish or blue-green EPHEDRACEAE
- 11 Leaves not scalelike, conspicuous, persistent at least through most of the summer; twigs not or rarely whorled, variously colored
- 12 Leaves elliptic or linear, sessile or on petioles to 3 mm long; flowers not in heads, not verticillate
- 13 Leaves all opposite, 6-15 mm long; plants of rocky hills and washes; 50-100 cm tall; flowers conspicuous, corolla united, pink CAPRIFOLIACEAE
- 13 Upper and sometimes nearly all leaves alternate, sometimes over 15 mm long; plants of valleys, mostly near the Pine Valley Playa; flowers inconspicuous; corolla lacking (*Atriplex*) CHENOPODIACEAE
- 12 Leaves not elliptic, the blade often about as wide as long, on distinct petioles; flowers various
- 14 Leaves green, ovate, often toothed, abruptly petioled; twigs green; plants woody only at the very base, not strongly aromatic; flowers borne in heads, the corollas yellow (*Perityle*) ASTERACEAE
- 14 Leaves gray or gray-green, obovate or broadly oblanceolate, tapered to the petiole; twigs grayish or purplish; plants usually woody well above the base, strongly aromatic; flowers borne in verticils, purplish (*Salvia*) LAMIACEAE
- 10 Leaves and twigs alternate, sometimes fascicled and falsely appearing opposite or whorled
- 15 Plants armed with spines; leaves about 3-15 mm long, 1-5 mm wide except sometimes larger in CHENOPODIACEAE, sessile or nearly so and gradually tapered to an indistinct petiole

- 16 Twigs tomentose or hairs at least in lines; spines with fascicles of leaves (3-5) in the axils and often with globular tufts of matted hairs in the axils; flowers borne in heads; the heads subtended by 4-6 bracts; corollas united, bright yellow, 6-10 mm long, subtended by hairlike bristles (*Tetradymia*) ASTERACEAE
- 16 Twigs not tomentose except in *Polygala acanthoclada*, the axils of spines without tufts of matted hairs; flowers not in heads; petals free or lacking, not bright yellow, 2-10 mm long, without hairlike bristles
- 17 Young twigs glabrous to scabrous, greenish or yellow-green; leaves glabrous or scabrous
- 18 Plants (30) 50-150 cm tall, twigs glabrous, those of the current year succulent at first; leaves linear to terete, succulent (*Sarcobatus*) CHENOPODIACEAE
- 18 Plants 5-50 cm tall; twigs glabrate to puberulent, not succulent; leaves elliptic to narrowly oblanceolate or obovate, not succulent
- 19 Plants 5-20 cm tall, rare on the DER; petals 6-10 mm long POLYGALACEAE
- 19 Plants mostly over 15 cm tall, frequent to common in rocky hills; petals 4-7 mm long, whitish CELASTRACEAE
- 17 Young twigs scurfy to tomentose, grayish or whitish, not green
- 20 Leaves scurfy (covered with inflated but quickly collapsing hairs that appear as a dandrufflike covering) at least when young, 10-30 mm long, 5-12 mm wide, linear-oblanceolate, spatulate, obovate or orbicular; twigs sometimes scurfy; flowers inconspicuous; petals lacking CHENOPODIACEAE
- 20 Leaves not scurfy, 3-15 (25) mm long, 1-4 (6) mm wide, linear to narrowly oblanceolate, rarely broader; twigs glabrate or tomentose, not scurfy; flowers more or less conspicuous; petals present
- 21 Plants 5-25 (30) cm tall, very spiny; flowers borne on slender pedicels on or near young spines POLYGALACEAE
- 21 Plants 30-150 cm tall, more or less spiny; flowers sessile or nearly so, not all borne on or near spines ROSACEAE
- 15 Plants not armed with spines
- 22 Flowers borne in heads, the heads subtended by separate involucre bracts; corollas yellow, or if greenish then 10-14 mm long; plants often viscid or glandular pubescent at least in part; leaves mostly glabrous or scabrous ASTERACEAE
- 22 Flowers not borne in heads; corollas white to cream or lacking, not over 5 mm long; plants not viscid or glandular; leaves glabrous, scurfy, scabrous, sericeous, or tomentose
- 23 Both sides of leaves, young twigs, or both scurfy, sericeous, or tomentose; plants 10-100 cm tall, flowering from spring-fall
- 24 Inflorescence umbellike or trichotomously branched; flowers small but inconspicuous, the perianth white or pinkish; leaves, young twigs, and branches of the inflorescence tomentose (*Eriogonum*) POLYGONACEAE
- 24 Inflorescence narrow, spikelike; flowers inconspicuous; plants scurfy, sericeous, or tomentose to woolly CHENOPODIACEAE
- 23 At least the upper surface of leaves glabrous and green or at most puberulent; young twigs glabrate to puberulent; plants 30-150 cm tall, flowering in spring ROSACEAE
- 1 Plants cultivated or adventive at Headquarters; plants mostly trees
- 25 Plants evergreen; leaves needlelike or scalelike, aromatic with pinelike odor
- 26 Plants spreading shrubs, not over 1 m tall; leaves awl-shaped or linear, not over 1 cm long, borne singly (prostrate or common juniper) . . *Juniperus communis* L.
- 26 Plants trees or shrubs over 1 m tall; leaves various
- 27 Leaves scalelike, crowded, appressed, clothing the twigs, about 2-5 mm long; seeds borne in a berrylike cone, the cone not over 1.5 cm long
- 28 Plants much branched, the central trunk commonly not much if any larger than the lower primary branches; shrubs or shrublike trees, not over 5 m tall, also native to the DER; fruit (6) 8-14 mm in diameter; ultimate twigs over 1 mm thick *Juniperus osteosperma* (Torr.) Little

- 28 Plants with a strong central trunk or trunks much larger than the primary branches, upright narrow-crowned trees, over 5 m tall, not native to DER; fruit 4-8 mm in diameter; ultimate twigs less than 1 mm thick
- 29 Mature scalelike leaves mostly overlapping the ones directly above; dorsal gland on each leaf much shorter than the distance between the gland and the leaf tip (eastern redcedar) *Juniperus virginiana* L.
- 29 Mature scalelike leaves seldom overlapping the ones directly above; dorsal gland on each leaf equaling or exceeding the distance between the gland and the leaf tip (Rocky Mountain juniper; Rocky Mountain redcedar) *Juniperus scopulorum* Sarg.
- 27 Leaves needlelike, 2-3 in a fascicle, 7-20 cm long; seeds borne in woody cones with many overlapping scales, the cones 7-12 (15) cm long (ponderosa pine) *Pinus ponderosa* Laws.
- 25 Plants not evergreen; leaves not aromatic with pinelike odor, not needlelike, not scalelike except in *Tamarix*
- 30 Leaves pinnately compound with (5) 11-36 leaflets; fruit a large pod; trees more or less thorny
- 31 Leaves twice-pinnately compound; flowers regular; petals 3-5, separate, yellowish; stamens 3-10, distinct; pods 7-35 cm long (honey locust) *Gleditsia triacanthos* L.
- 31 Leaves once-pinnately compound; flowers papilionaceous (with banner, wings, and keel), white; stamens 10, 9 united and 1 free (diadelphous), the united filaments forming a sheath around the ovary; pods 4-12 cm long (black locust) *Robinia pseudoacacia* L.
- 30 Leaves simple
- 32 Leaves toothed; trees
- 33 Leaves slightly oblique at the base; petioles 3-10 mm long; petals lacking (Siberian elm) *Ulmus pumila* L.
- 33 Leaves obtuse to cordate at the base; petioles 10-30 (40) mm long; petals 8-12 mm long (apricot) *Prunus armeniaca* L.
- 32 Leaves entire; trees or shrubs
- 34 Leaves scalelike, not over 4 mm long, appressed to and clothing the twigs; plants shrubs or small trees (salt cedar, tamarisk) (*Tamarix gallica* L. and *T. pentandra* Pall. misapplied) *Tamarix ramosissima* Ledeb.
- 34 Leaves 3-10 cm long, not scalelike, not clothing the twigs; plants trees (Russian olive) *Elaeagnus angustifolia* L.

KEY 2: HERBACEOUS PLANTS WITH FLOWERS AT OR NEAR ANTHESIS

- 1 Flowers few to numerous in heads, small and by casual observation whole heads appearing as a single flower; heads subtended by an involucre of 1 to several series of separate bracts, the bracts mostly more than 5, seldom over 3 mm wide, mostly equaling and enveloping the flowers; calyx lacking or modified into a pappus of bristles or scales; corollas tubular or flattened and strap-shaped; ovary inferior; sunflowers, daisies, asters, thistles, dandelions, and ragweeds ASTERACEAE
- 1 Flowers not in involucre heads or if so then the involucre bracts not more than 5 and mostly over 3 mm wide and mostly shorter than the flowers; calyx lacking or various but not modified into a pappus of bristles or scales; corollas various; ovary inferior or superior
- 2 Sepals 4, separate; petals 4, separate (appearing united at the base by a long floral tube in ONAGRACEAE); fruit linear to orbicular, a capsule or modified capsule
- 3 Leaves digitately 3-7 foliate, the leaflets 2-7 cm long; petals purple; stamens exerted well beyond the petals; fruit stipitate CAPPARIDACEAE
- 3 Leaves simple or pinnately lobed, pinnatifid or pinnately compound
- 4 Leaves whorled GENTIANACEAE
- 4 Leaves not whorled
- 5 Stamens 8; style slender and elongate, usually equaling or exceeding the petals, obviously distinct from the ovary; stigmas discoid or divided into 4 linear lobes; petals 4-40 mm long, borne on a 4-50 mm long floral tube; ovary inferior; plants with simple hairs ONAGRACEAE

- 5 Stamens 6; style various but often obsolete; stigmas entire or slightly bilobed; petals lacking or to 17 mm long; floral tube lacking; ovary superior; plants glabrous or with simple, forked, branched, or stellate hairs BRASSICACEAE
- 2 Sepals not 4 and separate; petals not 4 and separate; fruit various
 - 6 Flowers sweetpea type (the corolla papilionaceous), the uppermost petal (banner) the largest and more or less turned 90° to the lower ones, the 2 lateral petals (wings) equal and more or less enfolding the lowermost petals (keel) which are united and strongly folded (boat-shaped); leaves trifoliolate or once-pinnate compound or once-palmate compound; the leaflets well marked, entire or finely toothed, jointed to the rachis or petiole FABACEAE
 - 6 Flowers not as above; leaves rarely with the above combination of features
 - 7 Leaves all basal (some pulvinate caespitose plants with leaves only appearing all basal are keyed both ways)
 - 8 Leaves toothed, lobed or compound
 - 9 Corolla united 2-5 cm long, very irregular (*Pedicularis*) SCROPHULARIACEAE
 - 9 Corolla not united, less than 2 cm long, regular
 - 10 Flowers solitary and terminal; petals about 12-15 mm long, reddish or pink-purple; leaves palmately cut RANUNCULACEAE
 - 10 Flowers usually more than 1; petals not over 7 mm long, variously colored; leaves various
 - 11 Leaves palmately lobed less than half the way to the base; inflorescence a spicate or racemose panicle (*Heuchera*) SAXIFRAGACEAE
 - 11 Leaves ternate or pinnately cut, mostly more than half the way to the base
 - 12 Petals pinkish, about 5-7 mm long; flowers not in umbels GERANIACEAE
 - 12 Petals white or yellow, 1-3 mm long; flowers in compact headlike or open umbels APIACEAE
 - 8 Leaves simple and entire
 - 13 Scapes lacking; flowers sessile among the leaves, not in heads; leaves mostly 3-6 mm long, opposite, crowded on short stems and more or less appearing basal, sessile; plants mat or mound forming
 - 14 Flowers showy, exceeding the leaves; leaves not subtended by scarious stipules; plant rather densely pubescent with cobwebby hairs or some leaves over 6 mm long (*Phlox*) POLEMONIACEAE
 - 14 Flowers inconspicuous, hidden among the leaves; corolla lacking; leaves 3-6 mm long, subtended by scarious stipules about as long as the leaves; plants glabrous or puberulent CARYOPHYLLACEAE
 - 13 Scapes or peduncles present, sometimes short; leaves mostly over 6 mm long or flowers in heads; leaves all basal, or peduncles sometimes with bractlike leaves; plants various
 - 15 Flowers with 6 separate petaloid tepals, mostly 7-60 mm long; stamens 6
 - 16 Flowers 4-6 cm long, pendulous, in racemes; leaves rigid, sword-like, evergreen, often with curled fibers shredding from the margins, 10-50 cm long or longer; plants from woody caudices AGAVACEAE
 - 16 Flowers not over 1.5 cm long, in umbels or if in racemes then not pendulous; leaves not rigid, not swordlike, not evergreen, without shredding fibers, seldom over 10 cm long; plants from bulbs LILIACEAE
 - 15 Flowers either with united corolla or with 4 or 5 or more than 6 separate petals or petals lacking; sepals 4 or 5 or calyx united or lacking; stamens not 6
 - 17 Flowers solitary and terminal on a jointed scape, the scape with a whorl of scarious bracts subtending the joint; petals more than 10, 10-35 mm long; stamens 20-50; leaves fleshy, 1.5-3 (5) cm long; plants rare PORTULACACEAE

- 17 Flowers not solitary as above, in heads or in an open inflorescence; scapes not jointed, without a whorl of bracts; petals lacking, the petaloid perianth united, 2-15 mm long; stamens 4, 5, or 9
- 18 Plants perennial with woody creeping stems, growing on rock faces, flowering in August and September (*Petrophytum*) ROSACEAE
- 18 Plants annual or if perennial then flowering in spring and early summer
 - 19 Flowers 11-15 mm long, sessile, several together in heads, the heads subtended by scarious bracts; leaves glabrous, glaucous; plants perennial (*Abronia nana*) NYCTAGINACEAE
 - 19 Flowers 2-6 mm long, few together in small united involucre, pediceled, the slender pedicel included or exserted from the involucre; inflorescence open or congested into a head; leaves hairy; plants annual or perennial POLYGONACEAE
- 7 Leaves not all basal
 - 20 Flowers spurred, sepals and petals blue and of equal texture; leaves alternate, palmatifid, the primary divisions again lobed (*Delphinium*) RANUNCULACEAE
 - 20 Flowers not spurred, variously colored; leaves various
 - 21 Perianth of united corolla or calyx
 - 22 Plants lacking chlorophyll, whitish or pale reddish, not at all green, more or less fleshy, parasitic on roots of other plants; leaves bract-like, entire OROBANCHACEAE
 - 22 Plants with chlorophyll more or less greenish or sometimes covered with whitish or grayish hairs, not fleshy, not parasitic; leaves various
 - 23 Leaves opposite or whorled
 - 24 Leaves whorled, mostly 4 per node RUBIACEAE
 - 24 Leaves opposite
 - 25 Leaves irregularly toothed and cleft, often with 1 or 2 pairs of pinnatifid primary lower segments that are smaller than the terminal one; flowers about 5 mm long, more or less hidden in entire lance-linear bracts; plants annual or perennial, introduced, occasional weed at Headquarters, mostly along roads (vervain or verbena) *Verbena bracteata* Lag. & Rodr.
 - 25 Leaves not as above; flowers various
 - 26 Flowers regular (symmetrical) or nearly so
 - 27 Leaves sessile, linear or divided into linear segments, not over 5 mm wide or the segments not over 2 mm wide; styles divided into 3 linear lobes POLEMONIACEAE
 - 27 Leaves not sessile or at least not linear, mostly over 5 mm wide; styles entire NYCTAGINACEAE
 - 26 Flowers more or less irregular, the corolla at least 2-lipped
 - 28 Stems gray or white with woolly hairs, or if only puberulent then the leaves only 5-15 mm long and 1-4 mm wide; stems square in cross section; corollas 5-12 mm long LAMIACEAE
 - 28 Leaves glabrous or puberulent, at least some well over 15 mm long; stems not square in cross section; corollas 8-35 mm long (*Penstemon*) SCROPHULARIACEAE
 - 23 Leaves alternate
 - 29 Plants trailing or climbing, probably restricted to irrigated places at Headquarters; leaves usually hastate-lobed, some usually over 2 cm long; corollas 1-3 cm wide (wild morning glory; field bindweed) *Convolvulus arvensis* L.
 - 29 Plants not trailing or climbing, sometimes prostrate, but then the leaves not over 16 mm long, not restricted as above; leaves not hastate-lobed; corollas various
 - 30 Leaves simple, entire; plants with rather harsh nonviscid and nonglandular hairs; styles 1, entire; fruit of 1-4 nutlets BORAGINACEAE

- 30 Leaves toothed to pinnately lobed or pinnatifid, or if entire then styles 2-3 or 2-3-cleft; fruit a capsule; plants often with viscid or gland-tipped hairs
 - 31 Styles 1 entire; stamens 4; corolla irregular, 16-35 mm long, reddish or purplish SCROPHULARIACEAE
 - 31 Styles 2 or 3 or 2-3-cleft; stamens 5; corolla regular, 2-12 (15) mm long, whitish, blue, pinkish, sometimes with a yellow tube
 - 32 Styles 2 or 2-cleft; flowers borne in a coiled one-sided racemose inflorescence that uncoils as the flowers mature (a scorpioid cyme) HYDROPHYLLACEAE
 - 32 Styles 3 or 3-cleft; flowers axillary or in a congested headlike or an open paniculate inflorescence, not in a scorpioid cyme POLEMONIACEAE
- 21 Perianth of separate petals and sepals or the petals lacking or rarely united at the base
 - 33 Tepals 6 or sepals 3 and petals 3; stamens 6; leaves sessile, linear, parallel veined, often more or less sheathing; plants from bulbs, the bulbs often deep in the ground and often missed in collecting LILIACEAE
 - 33 Petals or sepals or both in sets of 4 or 5; stamens not 6; leaves various but seldom with the above combination of features; plants not from bulbs
 - 34 Perianth of a single whorl, the tepals not over 3 mm long
 - 35 Plants pulvinate caespitose; leaves 3-6 mm long, densely crowded concealing the stems, subtended by scarious stipules about as long as the leaves; flowers sessile, more or less hidden in the leaves (*Paronychia*) CARYOPHYLLACEAE
 - 35 Plants not as above in all features
 - 36 Leaves opposite or whorled, 3-20 mm long; fruit various
 - 37 Leaves whorled, 4 per node; plants without milky juice RUBIACEAE
 - 37 Leaves opposite, 2 per node; plants with milky juice EUPHORBIACEAE
 - 36 Leaves alternate; fruit one-seeded; seeds often shiny
 - 38 Leaves with sheathing scarious stipules (*Polygonum*) POLYGONACEAE
 - 38 Leaves without sheathing stipules
 - 39 Flowers obscured among many dry scarious persistent bracts; sepals scarious; leaves not scurfy nor pilose; plants occasional or rare weeds at Headquarters AMARANTHACEAE
 - 39 Flowers not obscured by scarious bracts; sepals various; leaves scurfy or pilose CHENOPODIACEAE
 - 34 Perianth of two whorls (both petals and sepals present), the sepals of different texture and color from the petals; petals mostly over 3 mm long except in *Petrophytum*
 - 40 Leaves opposite or whorled
 - 41 Leaves pinnately compound; petals pink; fruit with a stylar beak 1-5 cm long GERANIACEAE
 - 41 Leaves simple; petals not or rarely pink; fruit not beaked
 - 42 Leaves whorled, 3-4 per node, not needlelike GENTIANACEAE
 - 42 Leaves opposite, 2 per node, needlelike CARYOPHYLLACEAE
 - 40 Leaves alternate
 - 43 Leaves mostly basal, those of the scapelike peduncle 1-3 mm wide (*Petrophytum*) ROSACEAE
 - 43 Leaves not all basal, those of the stem well over 3 mm wide
 - 44 Petals white, 2-5 cm long; stamens numerous; plants prickly-hispid and spinulose, 30-80 (100) cm tall PAPAVERACEAE

- 44 Petals not white; stamens various; plants neither prickly-hispid nor spinulose, of various stature
- 45 Petals orange; stamens numerous, the filaments united into a sheath that surrounds the 10-14 styles; plants glabrate to tomentose with stellate hairs; leaves pinnately lobed to palmately divided MALVACEAE
- 45 Petals blue or yellow; stamens 5-numerous, not united; styles 1 or 5; plant not with stellate hairs; leaves various but not palmately divided
- 46 Leaves entire, glabrous, glaucous; petals blue or rarely yellow, 10-15 (20) mm long; stamens 5; styles 5 LINACEAE
- 46 Leaves toothed to deeply lobed, pubescent with retrorsely barbed clinging hairs; petals yellow, 2-6 mm long and stamens 5, or 25-80 mm long and stamens numerous; styles 1 LOASACEAE

KEY 3: HERBACEOUS PLANTS WITH LEAVES COMPOUND, PINNATIFID, OR PALMATIFID

- 1 Leaves once compound with well marked leaflets; leaflets jointed to the rachis or petiole, not at all confluent
 - 2 Leaves 3-7-foliolate, leaflets entire, 1-7 cm long; plants 30-80 cm tall, caulescent, annual CAPPARIDACEAE
 - 2 Leaves not as above, if 3-foliolate then the leaflets toothed or lobed; plant not as above except in *Melilotus* (FABACEAE)
 - 3 Leaflets 3, ovate to orbicular, toothed to lobed; leaves all basal; stipules lacking; inflorescence an umbel (*Cymopterus*) APIACEAE
 - 3 Leaflets either more than 3, or entire, or leaves not all basal; stipules well developed; inflorescence not an umbel
 - 4 Leaflets toothed to lobed, several; leaves pinnate, opposite and basal or rarely all basal GERANIACEAE
 - 4 Leaflets entire or if toothed then only 3; leaves alternate and basal or all basal FABACEAE
- 1 Leaves more than once compound or 1-3 times pinnatifid with more or less confluent segments that are not jointed to the rachis or petiole
 - 5 Leaves palmately cut, or if trifid then the 3 segments entire and filiform or linear; plants perennial except in *Cordylanthus* (SCROPHULARIACEAE)
 - 6 Leaves divided into 3-7 entire, filiform or linear segments, sessile or with an indistinct petiole
 - 7 Plants with viscid-villous hairs; leaf-segments not needlelike with a tiny mucronate point SCROPHULARIACEAE
 - 7 Plants glabrate to tomentose but not with viscid-villous hairs; leaf segments needlelike and with a tiny mucronate point POLEMONIACEAE
 - 6 Leaves divided into 3 or more primary segments that are again toothed or lobed, abruptly contracted to a distinct petiole
 - 8 Plants with scattered to dense stellate hairs MALVACEAE
 - 8 Plants glabrous or with simple hairs only RANUNCULACEAE
 - 5 Leaves pinnately cut or if trifid then the 3 primary segments toothed to lobed
 - 9 Plants more or less tomentose to woolly at least in part, without stipitate glandular hairs; flowers in heads or in a headlike inflorescence
 - 10 Leaves with 3-7 segments, less than 2 cm long, the segments entire, linear, not over 1 cm long; calyx united, tubular (*Gilia congesta*) POLEMONIACEAE
 - 10 Leaves with few to several segments, the segments not linear and entire, or if so, then some usually over 1 cm long; calyx modified into a pappus of separate scales (*Chaenactis*, *Hymenopappus*, and *Hymenoxys richardsonii*) ASTERACEAE
 - 9 Plants not tomentose, with some cobwebby hairs in *Gilia inconspicua* but then also with stipitate-glandular hairs in the inflorescence

- 11 Plants with milky juice, glabrous or stipitate glandular; flowers borne in heads, enveloped in an involucre of bracts; involucre not spinulose; calyx modified into a pappus of numerous capillary whitish bristles, the bristles more or less persistent on the seeds (achenes) (*Malacothrix*, *Prenanthe*, *Stephanomeria*, and *Taraxacum*) ASTERACEAE
- 11 Plants without milky juice; flowers not in heads except in *Ambrosia* with spinulose involucre; calyx not as above
 - 12 Leaves all basal, decomposed or at least dissected into numerous fine segments; plants perennial; flowers borne in scapose umbels APIACEAE
 - 12 Leaves not all basal or if so plants annual; flowers not in scapose umbels
 - 13 Plants stellate pubescent (*Descurainia*) BRASSICACEAE
 - 13 Plants not stellate pubescent
 - 14 Plants 25-80 cm tall or taller, glabrous and glaucous, or pilose; at least the lower leaves 3-14 cm long, the upper ones sometimes entire; fruit 3-14 cm long, linear (*Caulanthus* and *Stanleya*) BRASSICACEAE
 - 14 Plants 3-30 cm tall, glabrous, or variously pubescent; leaves various but seldom as above in all features; fruit mostly less than 3 cm long, linear or not
 - 15 Plants perennial, with viscid-villous hairs at least in the inflorescence, not stipitate-glandular (*Castilleja*) SCROPHULARIACEAE
 - 15 Plants annual, if viscid-villous then also mostly stipitate-glandular also
 - 16 Plants stipitate-glandular or some of the leaf segments ending in a tiny mucronate point, or both; herbage often with a skunklike odor, occasionally villous or with cobwebby hairs
 - 17 Neither the lobes nor the teeth of lobes of leaves ending in a mucronate point; plants without tomentum; flowers in a coiled racemose inflorescence that uncoils as the flowers mature (scorpioid cyme) HYDROPHYLLACEAE
 - 17 At least some of the lobes or teeth of the lobes of leaves ending in a tiny mucronate point; leaves stipitate-glandular or not; plants sometimes with some tomentum; inflorescence headlike to open but not a scorpioid cyme POLEMONIACEAE
- 16 Plants not stipitate-glandular; leaf segments not ending in a mucronate point; herbage without a skunklike odor, neither villous nor with cobwebby hairs
 - 18 Stems few to several, decumbent radiating out from the taproot, each with 3 or more pairs of opposite leaves; leaves with 1 or 2 pairs of pinnatifid primary lower segments that are smaller than the terminal one; inflorescence strongly bracteate, the bracts entire; plants introduced, weedy, known from about Headquarters *Verbena bracteata* Lag. & Rodr.
 - 18 Stems solitary or few, mostly erect or ascending, with alternate leaves or with 1-3 pairs of opposite leaves; leaves not as above in all features; plants not restricted as above
 - 19 Terminal part of leaves not as regularly or as deeply cut as the lower part, and often only toothed to entire (*Camissonia*) ONAGRACEAE
 - 19 Leaves about equally cut from base to tip
 - 20 Leaves once pinnately compound with toothed to lobed leaflets, with conspicuous stipules; stem-leaves opposite; basal rosette well developed GERANIACEAE
 - 20 Leaves once or twice pinnatifid; stipules lacking; stem leaves alternate or if a few of the lower ones opposite, then the basal rosette lacking
 - 21 Plants 2-15 (20) cm tall, glabrous to hirtulose with short hairs, flowering in spring; basal rosette well developed; leaves once pinnatifid, to 1 cm wide; fruit not burlike (*Lepidium*) BRASSICACEAE

- 21 Plants (10) 15-30 cm tall, with spreading strigose and hirsute hairs, flowering in fall; at least some of the leaves bipinnatifid, mostly over 1 cm wide; basal rosette lacking; fruit enclosed in a burlike involucre with 8-20 short spines (*Ambrosia*) ASTERACEAE

KEY 4: HERBACEOUS PLANTS WITH LEAVES SIMPLE AND TOOTHED OR LOBED

- 1 At least some of the leaves with spiny or spinulose margins
- 2 Stems prickly with harsh spreading hairs; plants not floccose or tomentose PAPAVERACEAE
- 2 Stems not prickly or if so then plants floccose or tomentose at least in part (*Cirsium* and *Machaeranthera*) ASTERACEAE
- 1 Leaves without spinulose margins
- 3 Plants with forked, branched, or stellate hairs, or leaves sessile and auriculate clasping at the base, not uniformly toothed from base to tip, or plants with both hairs and leaves as preceding; flowers not in resinous heads
- 4 Plants perennial; leaves not auriculate, with rounded teeth or lobes, densely stellate pubescent, the dense hairs giving a whitish or grayish color to the leaves MALVACEAE
- 4 Plants annual, or if perennial then leaves auriculate; leaves variously toothed, glabrous to variously pubescent, but the hairs rarely so dense as to color the herbage (*Camelina*, *Draba*, *Malcolmia*, and *Streptanthus*) BRASSICACEAE
- 3 Plants glabrous or with simple hairs; leaves sessile or petioled but not auriculate, or if auriculate then flowers in resinous heads and leaves uniformly toothed from base to tip
- 5 Leaves orbicular or nearly so, all basal, strongly dentate and sometimes palmately lobed as well, rounded to cordate at the base, abruptly contracted to a distinct petiole, the petiole often as long or longer than the blade
- 6 Plants glabrous and glaucous, of fans and hills; inflorescence an umbel (occasional specimens of *Cymopterus basalticus*) APIACEAE
- 6 Leaves hirsute-ciliate; plants sometimes otherwise pubescent or glandular, not glaucous, of rock crevices (*Heuchera*) SAXIFRAGACEAE
- 5 Leaves narrower than orbicular or not all basal, seldom strongly dentate (except in *Atriplex rosea*), not palmately lobed, sessile or gradually tapered to a petiole
- 7 Leaves with dense retrorse-barbed minute hairs, clinging to clothing and other porous and even nonporous objects LOASACEAE
- 7 Leaves without retrorse-barbed hairs
- 8 Leaves toothed or with a pair of hastate lobes, not strongly pinnately lobed; plants annual or perennial, with or without a basal rosette
- 9 Stems prostrate, trailing, or climbing
- 10 Plants restricted to irrigated areas at Headquarters, trailing, twining, or climbing, not with milky juice; leaves often with a pair of hastate lobes (field bindweed, wild morning glory) (see also *Amaranthus blitoides*) *Convolvulus arvensis* L.
- 10 Plants native, prostrate, with milky juice; leaves toothed near the apex EUPHORBIACEAE
- 9 Stems lacking or not as above, mostly ascending to erect
- 11 Plants tomentose to woolly
- 12 Leaves opposite, petioled, crenate; stems more or less square in cross section; plants from taproots (*Marrubium*) LAMIACEAE
- 12 Leaves alternate, sessile or gradually tapered to a narrowed base, serrate or dentate to lobed; stems not square in cross section; plants from rhizomes (*Artemisia ludoviciana*) ASTERACEAE
- 11 Plants not tomentose or woolly
- 13 Plants perennial, from long-lived bases, sometimes glandular; leaves basal, opposite or alternate

- 14 Leaves all basal, not glandular, grayish or whitish from dense hairs; stems lacking; flowers sessile in the basal rosette of leaves, with a long floral tube (*Oenothera*) ONAGRACEAE
- 14 Leaves alternate or opposite, not grayish or whitish from dense hairs; stems well developed; flowers various but not sessile in the basal rosette
 - 15 At least some of the upper leaves alternate; flowers borne in heads, yellow at least in the center of the heads ASTERACEAE
 - 15 Leaves all opposite; flowers not in heads, not yellow
 - 16 Stem leaves sessile or gradually tapered to an inconspicuous petiole; plants glabrous or nearly so except sometimes with viscid hairs in the inflorescence (*Penstemon*) SCROPHULARIACEAE
 - 16 At least some of the stem leaves with distinct petioles; plants glandular pubescent almost throughout (*Oxybaphus*) NYCTAGINACEAE
- 13 Plants annual, not glandular except in *Gilia*, leaves alternate or rarely all basal or a few lower ones opposite in *Helianthus*
 - 17 Plants glandular, sometimes densely hairy also, seldom over 10 cm tall (*Gilia*) POLEMONIACEAE
 - 17 Plants not glandular, or regularly over 10 cm tall, not densely hairy, of various stature
 - 18 Plants 2-5 cm tall, hirtulose or hirsute; leaves not hastate, all alternate (*Lepidium*) BRASSICACEAE
 - 18 Plants either taller or with some of the leaves hastate, hispid or scurfy
 - 19 Leaves alternate, more or less constricted to petioles, mostly less than 2.5 cm long, not sessile and auriculate, the blades rarely uniformly toothed from base to apex, the teeth not sharp; plants glabrous or scurfy, not resinous; flowers not in heads, not yellow, inconspicuous (see lead 39 in KEY 2)
 - 19 Either the lower 1 or 2 pairs of leaves opposite and on petioles 2.5-4 cm long or longer or the stem-leaves sessile and more or less auriculate, the blades often uniformly toothed from base to apex; plants short-hairy or very resinous; flowers in heads, at least some yellow, conspicuous ASTERACEAE
- 8 Leaves conspicuously pinnately lobed; plants mostly annual; basal rosette usually well developed
 - 20 Plants with milky juice; flowers borne in heads, the heads of flowers enveloped in involucre bracts, with numerous capillary pappus bristles ASTERACEAE
 - 20 Plants without milky juice; flowers not in heads, not with pappus bristles
 - 21 Plants (25) 30-100 cm tall; stems glabrous, glaucous, and strongly inflated or strongly hispid-pilose with spreading hairs and not inflated; fruit 7-14 cm long, linear (*Caulanthus*) BRASSICACEAE
 - 21 Plants mostly less than 30 cm tall; stems not inflated, not hispid-pilose; fruit less than 7 cm long, linear or not
 - 22 Plants perennial; lobes of leaves with whitish-margined dentate teeth; inflorescence usually overtopped by the leaves, with some villous, viscid, multicellular hairs (*Pedicularis*) SCROPHULARIACEAE
 - 22 Plants annual or winter annual; lobes of leaves not with whitish-margined dentate teeth; inflorescence exceeding the leaves
 - 23 Leaves deeply lobed toward the base, toothed to nearly entire toward the tip (*Camissonia*) ONAGRACEAE
 - 23 Most of the leaves about equally lobed from the base to the tip

24 Leaves densely glandular, many of the glands stipitate; lobes of the leaves rounded, with crenate teeth; plants glandular throughout, conspicuously malodorous

HYDROPHYLLACEAE

24 Leaves not or sparsely glandular; lobes of the leaves acute, entire or with serrate or dentate teeth; plants various, but weakly if at all malodorous

25 Stems and branches of the inflorescence glandular, many of the glands stipitate; at least a few of the lobes of leaves ending in a tiny mucronate tooth (*Gilia*)

POLEMONIACEAE

25 Stems and branches of the inflorescence glabrate or hirsute but not glandular; lobes of leaves not ending in a mucronate tooth (*Lepidium*)

BRASSICACEAE

KEY 5: HERBACEOUS PLANTS WITH LEAVES SIMPLE AND ENTIRE OR INCONSPICUOUSLY TOOTHED

- 1 Plants pubescent with at least some forked, branched or stellate or pick-shaped (malpighian) hairs BRASSICACEAE
- 1 Plants glabrous or with simple hairs only
 - 2 Plants pulvinate caespitose perennials, mat or mound forming, 2-5 cm tall; leaves 2-6 mm long, densely crowded
 - 3 Plants with obvious scapes; leaves all basal; leafy stems lacking; peduncles sometimes with reduced bracts; herbage densely pubescent; flowers borne in heads or headlike clusters (see lead 12 below)
 - 3 Plants without scapes; leaves crowded on short stems, opposite; herbage glabrous or pubescent; flowers sessile among the leaves
 - 4 Leaves subtended by scarious stipules, the stipules a half to about as long as the leaves (*Paronychia*) CARYOPHYLLACEAE
 - 4 Leaves without scarious stipules (*Phlox*) POLEMONIACEAE
 - 2 Plants not pulvinate caespitose, or if so then some of the leaves longer than 6 mm
 - 5 Leaves all basal; plants perennial except in some of *Eriogonum*
 - 6 Plants glabrous; leaves sessile, linear or gradually tapered to the tip
 - 7 Leaves rigid, swordlike, evergreen, often with curled fibers shredding from the margins, 10-50 cm long; flowers 4-6 cm long, pendulous. AGAVACEAE
 - 7 Leaves not rigid, not swordlike, not evergreen, the margins not with shredding fibers, often shorter than above; flowers smaller
 - 8 Plants from bulbs; leaves 1 or 2, or if more than 2 then some over 6 cm long LILIACEAE
 - 8 Plants not from bulbs; leaves more than 2, not over 6 cm long
 - 9 Leaves terete or nearly so, succulent, not at all viscid; plants from a cluster of roots, rare PORTULACACEAE
 - 9 Leaves flattened, not succulent, often more or less viscid; plants from a woody caudex, common (*Haplopappus acaulis*) ASTERACEAE
 - 6 Plants conspicuously pubescent at least in part, the leaf blades sometimes glabrous but then abruptly constricted to a petiole
 - 10 Leaves 3-20 mm long, including petioles if present, 1-5 mm wide; plants pulvinate
 - 11 Woody creeping stems over 2 cm long; plants flowering in the fall, growing on faces of rock outcrops; scapose-peduncles bracteate (*Petrophytum*) ROSACEAE
 - 11 Woody stems not as above; plants flowering in spring, on but not confined to rock faces; scapes not bracteate
 - 12 Leaves 4-20 mm long, at least some regularly over 10 mm long, 0.6-1.4 mm wide, strigose; scapes 2-10 cm tall (*Erigeron compactus*) ASTERACEAE
 - 12 Leaves 2-8 mm long, some usually over 1.4 mm wide, tomentose or densely villose; scapes 1-5 cm tall (*Eriogonum shockleyi* and *E. villiflorum*) POLYGONACEAE

- 10 At least some of the leaves over 20 mm long, including the petioles if present, often over 5 mm wide; plants various
- 13 Leaves linear, narrowly elliptic, narrowly oblanceolate to elliptic, sessile or gradually tapered to a petiole
- 14 Caudex surmounted by a tuft of woolly hair and by a scape as well as the leaves; flowers borne in a solitary head that is terminal on the scape, yellow; leaves 2-8 mm wide (*Hymenoxys acaulis*) ASTERACEAE
- 14 Caudex without tufts of woolly hairs; scape lacking; flowers sessile in the basal rosette, but with a 4-10 cm long floral tube; corolla white or pink when fresh, opening at night, withering within a few hours after daylight the next day (*Oenothera caespitosa*) ONAGRACEAE
- 13 Leaves ovate to orbicular, rather abruptly tapered to a petiole
- 15 Scapes and petioles usually glandular; plants perennial, not tomentose; flowers in heads subtended by 5 scarious involucre bracts, the perianth 15-20 mm long, well exceeding the bracts. NYCTAGINACEAE
- 15 Plants not glandular, if perennial then at least the leaves tomentose; flowers in heads or not
- 16 Leaves (including the petiole) 6-10 cm long; plants perennial from long-lived caudices; flowers borne in heads; scapes (10) 15-30 cm tall (*Enceliopsis*) ASTERACEAE
- 16 Leaves (including the petiole) less than 6 cm long; plants annual or perennial; flowers not in heads, or if so then scapes rarely over 15 cm tall (*Eriogonum*) POLYGONACEAE
- 5 Leaves not all basal; plants perennial or annual
- 17 Leaves opposite or whorled; plants perennial or leaves mostly with well-marked petioles
- 18 Leaves whorled with more than 2 per node, sessile
- 19 Leaves 5-20 mm long; plants puberulent RUBIACEAE
- 19 Leaves 20-80 mm long; plants glabrous
- 20 Leaves over 7 mm wide, all whorled GENTIANACEAE
- 20 Leaves 2-7 mm wide, not all whorled (*Fritillaria*) LILIACEAE
- 18 Leaves opposite, only 2 per node
- 21 Leaves linear to narrowly elliptic, not over 5 mm wide, sessile
- 22 Flowers and fruit on slender pedicels, not borne in the axils of leaves; the corolla of separate petals; leaves needlelike, less than 1 mm wide, glabrous or nearly so, lower stem glabrous or nearly so; inflorescence glandular, some of the glands stipitate (*Arenaria*) CARYOPHYLLACEAE
- 22 Flowers sessile or nearly so or some leaves over 1 mm wide or pubescent or both; corolla united
- 23 Flowers whorled in the axils of leaves, on pedicels about 2 mm long; plants strongly aromatic, moderately pubescent with short curved hairs (*Hedeoma*) LAMIACEAE
- 23 Flowers terminal or nearly so or sessile or pediceled; plants not aromatic, glabrous to pubescent with various kinds of hairs (*Phlox*) POLEMONIACEAE
- 21 At least some of the leaves broader than narrowly elliptic, less than or greater than 5 mm wide, at least the basal ones more or less constricted to a distinct petiole
- 24 Leaves (including petioles) 3-16 mm long, the blades more or less oblique at the base; plants with milky juice, with prostrate spreading stems EUPHORBIACEAE
- 24 At least some of the leaves over 16 mm long; plants without milky juice; stems not prostrate
- 25 Plants tomentose to woolly at least in part; stems more or less square in cross section (*Marrubium*) LAMIACEAE
- 25 Plants glabrous or pubescent but not tomentose or woolly
- 26 Plants annual, 30-60 cm tall or taller, scabrous, or hispid; upper leaves usually alternate (*Helianthus*) ASTERACEAE

- 26 Plants perennial, mostly less than 30 cm tall; upper as well as lower stem-leaves opposite
- 27 Stem-leaves sessile, sometimes clasping the stem at the base; plants glabrous and glaucous to puberulent or villose with viscid hairs, with a basal tuft of leaves
(*Penstemon*) SCROPHULARIACEAE
- 27 Stem-leaves more or less abruptly constricted to a petiole, this sometimes short; plants glabrous, glandular or stipitate glandular; basal tuft of leaves lacking or present
. NYCTAGINACEAE
- 17 Leaves alternate; plants annual or perennial, mostly with sessile leaves, or the blades gradually tapered to an indistinct petiole
- 28 Plants lacking chlorophyll, pale pink to whitish, not at all green, parasitic on roots of other plants; stems thickened, more or less fleshy; leaves scalelike OROBANCHACEAE
- 28 Plants with chlorophyll, greenish or pale colored from dense pubescence, not parasitic; stems not especially thickened, not fleshy; leaves various but hardly scalelike
- 29 At least some of the leaf blades elliptic to broadly ovate, at least some more or less abruptly constricted to a distinct petiole
- 30 Plants rather uniformly pubescent with villose or appressed hairs, 3-15 cm tall, rarely taller; leaf blades 4-15 mm long
- 31 Plants glandular and villose rare, in hills; at least some of the petioles about as long as the broadly elliptic to ovate blades
(*Phacelia incana*) HYDROPHYLLACEAE
- 31 Plants with appressed hairs, not glandular; petioles much shorter than the elliptic blades, not over 4 mm long, some leaves sessile
(*Camissonia boothii*) ONAGRACEAE
- 30 Plants glabrous to scurfy or hispid, often over 15 cm tall; leaf blades often over 15 mm long
- 32 Plants glabrous or more or less scurfy (see lead 39 of KEY 2)
- 32 Plants scabrous or hispid (*Helianthus*) ASTERACEAE
- 29 Leaf blades linear, narrowly oblanceolate or narrowly spatulate, sessile or gradually tapered to an indistinct petiole
- 33 Plants glabrous or at most scabrous
- 34 Plants annual, from taproots, sometimes much branched at the base (note: odd specimens of *Lepidium densiflorum* might be keyed here, but in plants of that taxon at least 1 or 2 leaves have lobes or teeth)
- 35 Leaves not over 2 mm wide; fruit with a horizontal wing
(*Halogeton* and *Salsola*) CHENOPODIACEAE
- 35 Leaves 1-12 mm wide, some always over 2 mm wide, 1.5-8.5 cm long; fruit not winged
- 36 Fruit linear, 3-6 cm long, many-seeded; plants erect
(*Streptanthella*) BRASSICACEAE
- 36 Fruit not linear, less than 0.5 mm long, 1-seeded; plants prostrate to decumbent (*Amaranthus*) (see lead 39 of KEY 2)
- 34 Plants perennial, from bulbs or caudices, the stems simple or sparingly branched
- 37 Leaves 1-3 cm long, well distributed on the stem, basal tufts lacking or weakly developed LINACEAE
- 37 At least some of the leaves over 3 cm long, basal tuft lacking or well developed, often crowded toward the base of the stem
- 38 Leaves strongly sheathing or the basal tuft lacking; plants from bulbs, not at all viscid, rare on DER
. LILIACEAE
- 38 Leaves not sheathing, the basal tuft well developed; plants from woody caudices, often viscid, rare to abundant on the DER (*Haplopappus acaulis* and *Petradoria*) ASTERACEAE

- 33 Plants pubescent or scurfy
 - 39 Flowers borne in heads, the heads subtended by more or less persistent involucre bracts; fruit an achene, the achenes surmounted by a pappus of capillary bristles (*Erigeron*, *Leucelene*, and *Townsendia*) ASTERACEAE
 - 39 Flowers not in heads; fruit not as above (note: odd specimens of *Lepidium densiflorum* might be keyed here but at least 1 or 2 leaves are toothed or lobed in plants of that taxon)
 - 40 Pubescence harsh, at least some of the stiff hairs strongly spreading and pustulate at the base; fruit of 4 nutlets, some of them occasionally abortive BORAGINACEAE
 - 40 Pubescence not especially harsh, the hairs not pustulate at the base
 - 41 Hairs pick-shaped (short stalked at about the middle, the stalk acting as a pivot on which one end of the appressed hair can be turned and the opposite end will turn about equal distance—a feature not easily detected without a dissecting scope and teasing needle) (*Erysimum*) BRASSICACEAE
 - 41 Hairs not pick-shaped, sometimes scurfy
 - 42 Plants with appressed hairs; fruit a capsule; petals 4, conspicuous ONAGRACEAE
 - 42 Plants scurfy, pilose, or sericeous to tomentose; fruit an urticle; petals lacking CHENOPODIACEAE

SECTION II: FAMILIES, GENERA, SPECIES

AGAVACEAE; AGAVE FAMILY

Yucca L. *Yucca*;
Spanish Bayonet

Yucca harrimaniae Trel. Harriman yucca, hoary yucca. (*Y. gilbertiana* [Trel.] Rydb.) Plants with semiwoody caudices; leaves basal, 10-30 (50) cm long, stiff, thick, linear, entire, glaucous, the tips spinose, the margins with exfoliating curly fibers; scapes 10-60 cm tall; flowers racemose, 4-6 cm long, pendant, the tepals white to pale green or cream; fruit a dehiscent capsule. Infrequent, hills and washes. Late May through June. *Yucca baccata* Torr. is cultivated at Headquarters. This differs from *Y. harrimaniae* by leaves to 65 cm long and to 5 cm wide and with indehiscent fruits.

AMARANTHACEAE; AMARANTH FAMILY

Amaranthus
L. *Amaranth*;
Pigweed

Annual, weedy herbs; leaves alternate, petioled, entire to wavy margined; flowers inconspicuous, clustered in leaf axils or crowded in terminal or axillary simple or compound spikes, the staminate ones mixed with the pistillate ones, subtended by green or red to purple bracts; sepals 1-5, free, membranous or herbaceous; petals lacking; stamens (1-3) 5; ovary superior, the styles 1-3; fruit a membranous, 1-seeded, circumscissile capsule; seeds shiny, blackish or dark brown.

1 Flowers in terminal as well as axillary, simple to compound spikes; stems erect; leaves sometimes over 3 cm long *A. retroflexus*

1 Flowers mostly in small axillary clusters; stems prostrate to ascending; leaves 0.8-3 cm long *A. blitoides*

Amaranthus blitoides Wats. Prostrate pigweed. (*A. graecizans* L. misapplied) More or less weedy along roads and about Headquarters. July through October.

Amaranthus retroflexus L. Redroot pigweed. (*A. hybridus* L.) Found in a few years about Headquarters (CCC Camp).

ANACARDIACEAE; SUMAC FAMILY

Rhus L.
Sumac

Rhus trilobata Nutt. var. *simplicifolia* (Greene) Barkl. Skunkbush sumac, squawbush. Shrubs 70-150 cm tall; leaves alternate, simple but deeply 3-lobed and usually coarsely toothed; flowers appearing before the leaves, small but in conspicuous clusters; petals 2-3 mm long, yellow-green; fruit 6-8 mm long; subglobose, red. Infrequent along Mountain Home Wash through Red Hills.

APIACEAE (UMBELLIFERAE); PARSLEY FAMILY

Perennial herbs (ours); leaves basal in ours, once to many times compound; flowers in umbels; umbels sometimes subtended by an involucre of bracts; pedicels sometimes subtended by an involucel of bractlets; calyx minute or lacking; petals small; fruit a schizocarp sometimes splitting at maturity into 1-seeded mericarps and disclosing a wire-like carpophore to which the reflexed mericarps are basally attached.

- 1 Leaves finely dissected into numerous ultimate small leaflets, the leaflets not over 3 mm wide
- 2 Rays of the umbel enveloped in a scarios involucre; flowers white or purplish; fruit with wings on the back as well as the lateral margins; plants developing a pseudoscape; carpophore mostly lacking *Cymopterus*
- 2 Involucre lacking; flowers yellowish; fruit with lateral wings only; pseudoscape lacking *Lomatium*
- 1 Leaflets 3, 5-20 (30) mm wide, or leaves simple and ternately cleft *Cymopterus*

Cymopterus Raf. Springparsley

Scapose perennial herbs from fibrous often enlarged taproots; leaves 3-foliolate to pinnately compound; umbels solitary; carpophore lacking or rudimentary; fruit strongly flattened, dorsal and lateral ribs winged.

- 1 Leaves finely dissected into numerous segments; rays of the umbel enveloped in a scarios involucre; flowers enveloped by scarios involucels, whitish or purplish; umbel headlike in fruit *C. purpurascens*
- 1 Leaves at most 3-foliolate, the leaflets 5-20 (30) mm wide, involucres and involucels lacking or green and not enveloping the rays or flowers; umbel not headlike
- 2 Flowers yellow; involucels green, well developed; leaves trifoliolate, usually with a conspicuous rachis; plants restricted to sandy ground in Pine Valley *C. newberryi*
- 2 Flowers white or purplish; involucels lacking or scarios; leaves simple or trifoliolate without a rachis; plants of upper fans and hills *C. basalticus*

Cymopterus basalticus Jones Dolomite springparsley, funnel flower, or funnel leaf. (*Aulospermum basalticum* [Jones] Tidestrom) Endemic to west Millard and Beaver Counties, UT, and adjacent White Pine County, NV; occasional on shallow soils over bedrock and on older alluvial fans. April through June. The name "*basalticus*" is a misnomer because the plant is found on dolomite and not on basalt.

Cymopterus newberryi (Wats.) Jones Sweetroot springparsley. Known from sandy ground at the east edge of the DER just north of Pine Valley Hardpan. April through June.

Cymopterus purpurascens (Gray) Jones Purple springparsley. (*C. utahensis* Jones; *Phellopterus utahensis* [Jones] Woot. & Standl.) Infrequent, mostly in hills and on fans. Late February through April.

Lomatium Raf. Biscuitroot; Desertparsley

Perennial scapose herbs from thickened taproots or caudices; leaves compound, much dissected into fine ultimate segments; umbels solitary; flowers small, yellowish; fruit flattened, the dorsal ribs more or less prominent, the lateral ribs winged.

- 1 Plants densely hirtellous *L. foeniculaceum*
- 1 Plants glabrous
- 2 Plants strongly aromatic; leaves ovate in outline; primary leaflets borne on petioles 1 cm long or longer; ultimate segments 0.2-0.3 mm wide, more than 150 per leaf *L. grayi*
- 2 Plants weakly if at all aromatic; leaves oblong, the primary leaflets sessile or nearly so; ultimate segments 0.4-2 mm wide, about 50-110 per leaf *L. scabrum*

Lomatium foeniculaceum (Nutt.) Coult. & Rose var. *macdougalii* (Coult. & Rose) Cronq. Fennel-leaved desertparsley. (*Cogswellia jonesii* [Coult. & Rose] Jones; *C. macdougalii* [Coult. & Rose] Jones; *L. macdougalii* Coult. & Rose) Infrequent; mostly in hills. April through May.

Lomatium grayi Coult. & Rose Desertparsley. (*Cogswellia grayi* Coult. & Rose) Occasional to common or locally abundant in cracks of rocks, outcrops, and rocky ground in hills. Late April to mid-June.

Lomatium scabrum (Coult. & Rose) Mathias Rough lomatium. (*Cynomarathoum scabrum* Coult. & Rose) Occasional or common or locally abundant, rock crevices and rocky ground, in hills. Late April to mid-June.

ASTERACEAE (COMPOSITAE); SUNFLOWER OR THISTLE FAMILY

Plants annual, biennial, or perennial, herbs or shrubs (ours); leaves basal, alternate, or opposite; flowers borne in heads subtended by an involucre of separate or united bracts; calyx modified to a pappus or none, the pappus of awns, scales, or of capillary or plumose bristles; corollas of 2 types, one type (disc corollas) tubular, regular, and mostly 5-lobed, the other type (ray corollas or rays) flattened and strap-shaped and 2-5 toothed at the apex; stamens usually 5, inserted on the corolla, usually united by their anthers or sometimes by their filaments; ovary inferior, 1-celled, 1-ovuled; styles usually 2-branched; fruit an achene, the achene often bearing the pappus.

- 1 Plants shrubs, woody well above ground level
 - 2 At least some of the leaves lobed or dissected, aromatic with sagebrushlike (camphorlike) odor, densely gray pubescent on both sides or else pinnately divided *Artemisia*
 - 2 Leaves entire or slightly toothed, not with sagebrushlike odor, not pubescent as above
 - 3 Leaf blades ovate or broader, abruptly constricted to a distinct petiole, sometimes toothed, sometimes opposite, 3-14 mm long; plants woody only at the base *Perityle*
 - 3 Leaf blades narrower than ovate, mostly linear to oblanceolate or nearly so, sessile or gradually narrowed to a petiolelike base, entire, alternate
 - 4 Involucral bracts 10-15 mm long, with alternating greenish and whitish parallel longitudinal lines (striate); flowers greenish, white, or cream when fresh, drying brownish-red; plants glandular-pubescent, strongly aromatic, flowering in spring *Brickellia*
 - 4 Involucral bracts less than 10 mm long, not striate; flowers yellow; plants glandular or not, aromatic or not, flowering in summer and fall except in *Tetradymia*
 - 5 Pappus of scales; heads with 3-7 ray flowers; twigs of the current year glabrous or at most scabrous, at least the upper two-thirds green throughout the growing season *Gutierrezia*
 - 5 Pappus of capillary bristles; ray flowers lacking except in *Haplopappus*; twigs of the current year pubescent, or if glabrous then usually whitish (at least not green) before flowering time
 - 6 Involucral bracts only 4-6 per head, about equal in 1 series, not imbricate, 5-10 mm long; twigs sometimes spiny, those of the season woolly-tomentose, the tomentum not impregnated with resin; leaves glabrous, nearly terete *Tetradymia*
 - 6 Involucral bracts mostly more than 6, slightly to strongly imbricate, at least the outer ones less than 5 mm long; twigs not spiny, tomentose or not, the tomentum when present often impregnated with resin; leaves glabrous or pubescent
 - 7 Young stems longitudinally striate with alternating lines of tomentum and glabrous or glabrate-glutinous ridges that are slightly raised above the tomentum; involucral bracts rather broad with rounded tips; plants localized in a sandy-gravelly wash in Pine Valley just to the east of the DER (scaleybroom) *Lepidospartum latisquamum* Wats.
 - 7 Young stems glabrous to tomentose but not striate as above; involucral bracts mostly narrow with acute to acuminate tips
 - 8 Ray flowers 1-10; disc flowers 4-15; involucre 3-8 mm wide, the bracts not or only weakly aligned in vertical rows; leaves oblanceolate to narrowly oblanceolate, many of them abruptly tipped with a mucro, sometimes stipitate-glandular; greenish twigs more or less stipitate-glandular or internodes only 1-3 mm long; plants of rock crevices and other rocky places in hills *Haplopappus*
 - 8 Ray flowers lacking; disc flowers various; involucre mostly 2-4 mm wide, the bracts more or less aligned in vertical rows; leaves linear to narrowly oblanceolate, mostly gradually tapered to the tip, not stipitate glandular; twigs often grayish or white, or if green then with tomentum matted in resin, glandular, the internodes usually over 3 mm long; plants of various habitats *Chrysothamnus*

- 1 Plants herbaceous, sometimes with a woody caudex, but this not extending much above ground level
 - 9 Leaves all basal
 - 10 Leaves pinnatifid to pinnately compound; heads with either all ray flowers or all disc flowers
 - 11 Heads with ray flowers only; plants with milky juice, not tomentose; scapes hollow; introduced and probably restricted to irrigated places and Headquarters (dandelion) (*Leontodon taraxacum* L.). *Taraxacum officinale* Weber in Wiggers
 - 11 Heads with disc flowers only; plants not with milky juice, tomentose, scapes not hollow; indigenous *Hymenopappus*
 - 10 Leaves entire; heads with ray and disc flowers
 - 12 Leaves 6-15 cm long including the petioles, the blades 1.5-3.5 cm wide; herbage densely white-pubescent *Enceliopsis*
 - 12 Leaves shorter or narrower than above, or both
 - 13 Marginal (ray) flowers white or pink, only the center of the heads (disc corollas) yellow; plants pubescent but not woolly *Erigeron*
 - 13 Ray and disc corollas yellow; plants glabrous to woolly at the base
 - 14 Plants glabrous or at most scabrous; pappus of capillary bristles *Haplopappus*
 - 14 Plants densely woolly toward the base just above the root crown, sometimes pubescent above; pappus of hyaline scales *Hymenoxys acaulis*
 - 9 Leaves not all basal
 - 15 Leaves compound or deeply lobed to pinnatifid (at least some), not with spiny margins, the basal cut ones sometimes deciduous leaving entire or nearly entire stem-leaves, but then plants with milky juice
 - 16 Hairs of stems strongly spreading, more or less stiff, multicellular, pustulate at the base; heads unisexual, the pistillate involucre burlike with 2-4 mm long prickles; flowers inconspicuous, pappus lacking; plants annual, flowering in late August through September *Ambrosia*
 - 16 Plants glabrous or with soft more or less tomentose hairs; involucre not burlike; plants annual and with conspicuous flowers in spring and summer or perennial; pappus present or plants perennial
 - 17 Plants not with milky juice, usually more or less tomentose at least when young; heads with disc flowers, rays sometimes lacking; pappus lacking, or of scales, or of capillary bristles only in *Senecio*
 - 18 Plants with sagebrushlike odor, perennial, flowering July through August (occasional plants of the woody *Artemisia spinescens* with flowers in spring may key here); flowers rather inconspicuous; involucre about 3-5 mm high; pappus lacking *Artemisia*
 - 18 Plants without sagebrushlike odor, annual or perennial, flowering in spring and early summer; flowers conspicuous; involucre 5-17 mm high; pappus of scales or bristles
 - 19 Ray flowers 3-8 mm long (or longer), yellow; pappus of capillary bristles; primary lobes of leaves mostly not entire, not linear, some usually over 3 mm wide *Senecio*
 - 19 Ray flowers lacking except in *Hymenoxys* which has leaves with linear lobes; pappus of scales; primary lobes of leaves often entire or linear or both, at least narrow, not over 3 mm wide
 - 20 Ray flowers 9-14, 8-20 mm long, yellow; disc flowers yellow; leaves once pinnatifid with 3-7 linear entire segments about 1-3 cm long, or a few leaves entire *Hymenoxys*
 - 20 Ray flowers lacking; leaves mostly twice or more pinnatifid
 - 21 Corollas yellow; plants long-lived perennials from branched caudices; leaves mostly basal, those of the stem mostly bractlike and mostly entire *Hymenopappus*
 - 21 Corollas white, cream, or pinkish; plants annual or biennial from taproots; leaves of mid-stem usually well developed and about equally cut as the lower leaves; basal leaves lacking or in a rosette the first season *Chaenactis*
 - 17 Plants with milky juice, glabrous or glabrate; heads with ray flowers only; pappus of capillary or capillary-plumose bristles

- 22 Ray corollas yellow, 7-14 mm long; pappus of simple bristles; leaves persisting at flowering time *Malacothrix*
- 22 Ray corollas pinkish, 4-7 mm long; pappus various; leaves often deciduous by flowering time
 - 23 Pappus bristles simple; plants 5-20 cm tall (DER) *Prenanthea*
 - 23 Pappus bristles plumose; plants often over 20 cm tall *Stephanomeria*
- 15 Leaves entire or toothed, or if lobed then with spiny margins; plants not with milky juice
 - 24 Leaf blades lance-ovate or broader, obtuse, truncate or cordate at the base and rather abruptly constricted to a distinct petiole, sometimes toothed, sometimes opposite
 - 25 Leaf blades 3-14 mm long; ray flowers lacking; disc corollas yellow; plants 10-20 (30) cm tall, perennial, of rocky places in hills *Perityle*
 - 25 Leaf blades over 20 mm long; rays 15-40 mm long, yellow; disc corollas brownish or blackish; plants (25) 30-60 cm tall or taller, annual, usually along roads and other disturbed places *Helianthus*
 - 24 Leaf blades narrower than above, mostly linear, narrowly elliptic, or narrowly oblanceolate, sessile or gradually tapered to a petiolelike base, toothed or entire, never opposite
 - 26 Leaves sharply toothed to spinulose or spiny on the margins, sometimes auriculate clasping at the base; plants not from rhizomes
 - 27 Plants resinous throughout, not hairy; pappus of deciduous short awns; ray and disc corollas yellow; leaves toothed the entire length, not spinulose; involucre bracts strongly recurved *Grindelia*
 - 27 Plants not resinous, except sometimes in the involucre, short-hairy to woolly; ray flowers lacking or not yellow; disc flowers various; leaves more or less spinulose; involucre bracts various
 - 28 Corollas pinkish or whitish; heads with disc flowers only, involucre bracts spinose; plants with some tomentose or floccose hairs, mostly 60-150 cm tall *Cirsium*
 - 28 Disc corollas yellow, ray flowers if present with whitish to purple corollas; involucre bracts not spinose; plants not all tomentose or floccose, mostly 5-40 cm tall *Machaeranthera*
 - 26 Leaves entire, or if a few with lobes or teeth then plants rhizomatous
 - 29 Plants 20-55 cm tall, from rhizomes, densely tomentose; leaves commonly entire but at least some usually toothed to deeply lobed *Artemisia ludoviciana*
 - 29 Plants mostly less than 20 cm tall, from rhizomes only in *Aster chilensis* (see lead 33 below), not densely tomentose; leaves entire
 - 30 Ray and disc flowers yellow, sometimes small and rather inconspicuous; plants woody at the base, glabrous or at most scabrous, often viscid
 - 31 Rays 6-15, 8-12 mm long; involucre 8-20 mm wide; plants flowering in May through June *Haplopappus*
 - 31 Rays (0) 1-4 (7), 2-7 (9) mm long; involucre 1.5-3.5 mm wide; plants flowering in August through October
 - 32 Pappus of capillary bristles; leaves in a basal tuft, reduced in size and number upward on the stems, 1-11 mm wide *Petradoria*
 - 32 Pappus of hyaline scales; leaves not in a basal tuft, not much if any reduced in size or number upward on the stem, 1-3 mm wide *Gutierrezia*
 - 30 Rays white, pinkish, or lavender; plants mostly not woody at the base, mostly pubescent, not or rarely viscid
 - 33 Plants rhizomatous, probably restricted to irrigated places at Headquarters; rays whitish to bluish (everywhere aster) *Aster chilensis* Nees
 - 33 Plants not rhizomatous, not restricted as above
 - 34 Involucre bracts mostly in a single series (except in *Erigeron argentatus*), mostly the same color throughout, not scarious margined and ciliate-fimbriate; ray flowers mostly over 20 per head; plants perennial from taproots and sometimes caudices; some leaves usually over 2 cm long *Erigeron*
 - 34 Involucre bracts in 2 or more overlapping series, sometimes bicolorred, scarious margined and ciliate-fimbriate; ray flowers

mostly less than 20 per head; plants annual or biennial, or if perennial then the leaves not over 2 cm long

35 Involucres 5-6 mm high; ray flowers exceeding the involucre by 1-3 mm, white; leaves 2-12 (20) mm long, linear or nearly so, a basal tuft lacking; plants perennial from branched caudices *Leucelene*

35 Involucres 7-8 mm high; ray flowers exceeding the involucre by 6-10 mm, usually pinkish; leaves 10-30 mm long, narrowly oblanceolate to linear, 3-12 mm wide, a basal rosette often well developed; plants annual or biennial from taproots (odd specimens or basal rosettes of *Machaeranthera canescens* might be keyed here) *Townsendia*

**Ambrosia L.
Ragweed**

Ambrosia acanthicarpa Hook. Bur ragweed. (*Franseria acanthicarpa* [Hook.] Coville) Annual, 9-50 (75) cm tall, pubescent with stiff pustulate hairs; leaves alternate or a few lower ones opposite, 1-4.5 cm long, pinnatifid to bipinnatifid; heads unisexual, the staminate ones in terminal racemes, nodding, consisting of stamens enveloped in a cuplike involucre; pistillate flowers in axils of leaves, the involucre burlike with prickles 2-4 mm long; corollas lacking; pappus lacking. Occasional in gravelly washes and in sandy areas, usually on disturbances.

**Artemisia L.
Sagebrush;
Wormwood;
Mugwort**

Perennial herbs or shrubs, mostly aromatic; leaves alternate, entire, lobed or dissected; heads small, mostly in panicles, or spicate panicles; involucre bracts imbricate in 2-4 series; ray flowers obsolete or lacking; disc flowers few; pappus none.

1 Plants rhizomatous herbs; leaves mostly 3-5 lobed at apex *A. ludoviciana*

1 Plants shrubs, not rhizomatous; leaves various
2 Leaves dissected with 5 or more linear or narrow segments; plants mostly 5-30 cm tall

3 Old flowering stalks developing into spines 10-30 mm long; leaves palmately dissected; plants flowering late May to early June; corollas and achenes densely long-hairy *A. spinescens*

3 Old flowering stalks not spiny; leaves more or less pinnately dissected; plants flowering August through October; corollas and achenes glabrous or glandular

4 Leaves distinctly once pinnate, green and nearly glabrous, 2-8 mm long; plants 5-20 cm tall *A. pygmaea*

4 Leaves more than once pinnate; silvery-canescens, 6-12 mm long; plants 5-40 cm tall *A. frigida*

2 Leaves entire, lobed or toothed, the lobes or teeth generally 2-5 per leaf

5 Heads with 1-3 fertile flowers, the involucre bracts villous throughout; leaves entire or finely tridentate with some of the teeth or lobes rather acute; flowering stalks often over a third the height of the plant *A. bigelovii*

5 Heads with 3-8 fertile flowers, the involucre bracts often glabrate in part; leaves mostly with 3 (5) rounded lobes or teeth; flowering stalks often less than a third the height of the plant

6 Plants mostly 5-30 cm tall, common and widespread on the DER; leaves mostly with dark green glandular dots showing through the pubescence ... *A. nova*

6 Plants 60-150 cm tall, restricted to a few places along Mountain Home Wash; leaves without or with obscure glandular dots showing through the pubescence *A. tridentata*

Artemisia bigelovii Gray Bigelow sagebrush. Occasional in rocky places in hills. August through September.

Artemisia frigida Willd. Fringed sagebrush. Locally common in a few places, seems to grow in eroding washes in Antelope Valley, but in loamy flats in Pine Valley. August through October. Grazed by sheep in winter and early spring.

Artemisia ludoviciana Nutt. Louisiana sagebrush, western mugwort, prairie sage. (*A. gnaphalodes* Nutt.; *A. incompta* Nutt.) Infrequent or rare in gravelly washes and rocky canyon bottoms of hills. July through September. DER plants are referable to var. *ludoviciana*.

Artemisia nova A. Nels. Black sagebrush. (*A. arbuscula* Nutt. ssp. *nova* [A. Nels.] Ward; *A. tridentata* ssp. *nova* H. & C.) Common to dominant on hills and sometimes valleys where soil is shallow over bedrock (Paleozoic sedimentary or Tertiary volcanic) or over strongly developed calcic horizons. Undoubtedly more common prior to grazing, and increasing where rested in at least some winters. August through September. Evergreen, prized sheep feed,

consistently palatable all winter long, and the staple of antelope winter diet on the DER.
Artemisia pygmaea Gray Pygmy sagebrush. Abundant in few local areas. August through September.

Artemisia spinescens D.C. Eaton in Wats. Bud sagebrush. Rare to common over most alluvial fan areas, probably much more abundant formerly than now, increasing in ungrazed areas and where sheep graze only in the cold part of winter. May to early June, with leaves and fruits deciduous before July. Highly palatable to sheep (less so to cattle), especially in late winter and early spring.

Artemisia tridentata Nutt. ssp. *tridentata* Basin big sagebrush. Known only from the canyon of Mountain Home Wash through Halfway Hills.

***Brickellia* Ell.
Brickellbush**

Brickellia oblongifolia Nutt. Mohave brickellbush. (*Coleosanthus oblongifolius* [Nutt.] Kuntze) Subshrubs or herbs, strongly aromatic, 10-30 (50) cm tall; leaves alternate, sessile or nearly so, 1-4 cm long, 1-15 mm wide, entire, glandular; involucre bracts 10-15 mm long, strongly striate; ray flowers lacking; disc flowers greenish, pappus of capillary bristles. Infrequent to common in washes across the fans that skirt Tunnel Springs Mountain. May through July.

***Chaenactis* DC.
Chaenactis; Dusty
Maiden; False
Yarrow**

Annual, biennial, or perennial herbs; leaves alternate or mainly basal, pinnately dissected or entire; heads solitary to several; involucre bracts in 1-3 series; ray flowers lacking; disc flowers whitish or pinkish; pappus of 4-20 hyaline scales.

- 1 Plants biennial or short-lived perennial with a well-developed basal rosette of leaves, rare on the DER; pappus of 10-16 scales *C. douglasii*
- 1 Plants annual, lacking a well-developed basal rosette of leaves, infrequent or common in some years; pappus of 4-8 scales
 - 2 Heads 15-22 mm high; flowers pink, longer than the involucre; anthers included; pappus scales in 2 sets (4 inner longer ones and 2-4 outer shorter ones) . . . *C. macrantha*
 - 2 Heads 6-11 mm high; flowers white, about equal or slightly longer than the involucre; anthers exerted; pappus scales in 1 set of 4 *C. stevioides*

Chaenactis douglasii (Hook.) H. & A. Douglas or hoary chaenactis. The one specimen seen is from near Halfway Summit. May through June.

Chaenactis macrantha D.C. Eaton Bighead chaenactis. Occasional or locally common at least in some years, mostly in areas of rodent activity on upper fans. May through June.

Chaenactis stevioides H. & A. Dryland false yarrow. Locally abundant in a few years following heavy autumn or winter moisture, not seen in some years; mostly in valleys. May through June.

***Chrysothamnus*
Nutt. Rabbitbrush**

Low to tall shrubs, commonly resinous and aromatic; leaves alternate, sessile or nearly so, linear to filiform, entire; inflorescence usually a racemose panicle or cyme; heads small, the involucre cylindrical, the bracts imbricate in more or less distinct vertical rows; ray flowers none; disc flowers 4-7 per head, yellow; pappus of capillary bristles.

- 1 Young stems tomentose, the tomentum often matted in and obscured by a thick coat of resin; plants 30-130 cm tall *C. nauseosus*
- 1 Young stems glabrous or at most scabrous; plants 15-40 cm tall, rarely taller
 - 2 Involucre bracts acuminate-cuspidate; leaves 1-2 mm wide *C. greenei*
 - 2 Involucre bracts obtuse or acute; leaves 1-5 mm wide *C. viscidiflorus*

Chrysothamnus greenei (Gray) Greene Greenes low rabbitbrush. Abundant to dominant on sandy fans.

Chrysothamnus nauseosus (Pallas) Britt. Rubber rabbitbrush. With 3 ssp. on the DER.

- 1 Involucres 9-11 mm high; corolla lobes villous; achenes glabrous or pubescent; plants of eolian sand in Pine Valley east of the DER (sanddune rubber rabbitbrush) ssp. *turbinatus* (Jones) H. & C.
- 1 Involucres less than 9 mm high; corolla lobes not villous; achenes various; plants found on the DER
 - 2 Ovaries and achenes glabrous; young stems greenish; leaves about 1-3 cm long, 0.5-1 mm wide, often deciduous before flowering time, terete or loosely triangular in cross section with a longitudinal groove on the upper side, keeled or rounded but not grooved on the lower side except sometimes at the base, with midnerves lacking or obscure; tomentum of leaves about equally matted in resin as that of the stems, or some hairs (especially those along the groove) free of the resin ssp. *leiospermus*

- 2 Ovaries and achenes hairy; young stems greenish or grayish; leaves sometimes over 3 cm long, sometimes over 1 mm wide, persistent at flowering time, flattened to strongly folded to nearly terete in cross section, variously grooved or not, with conspicuous midnerves; tomentum of leaves sometimes not matted in resin
- 3 Involucral bracts glabrous or ciliate with translucent hairs of the same texture as the scarious margins of the bract; young stems yellow-green; leaves less than 1 mm wide, loosely to strongly folded to nearly terete, grooved above, the lower midrib grooved; plants known from Headquarters (thread-leaf rubber rabbitbrush) ssp. *consimilis* (Greene) H. & C.
- 3 Involucral bracts (especially the lower ones) more or less tomentose, the hairs not all of the same texture as the scarious margin of the bracts; young stems gray or gray-green; leaves about 0.7-3 mm wide, flat to loosely folded, not grooved above, the lower midrib often keeled and not or obscurely grooved; plants widespread ssp. *hololeucus*
- Ssp. *hololeucus* (Gray) H. & C. All white rubber rabbitbrush. (*C. n.* var. *hololeucus* [Gray] Hall; *C. n.* var. *gnaphalodes* [Greene] Hall; *C. n.* ssp. *gnaphalodes* [Greene] H. & C.) Infrequent or locally common in the gravelly bottoms of some of the major washes and along roadsides and near some structures at Headquarters. September through October. Plants at the DER have grayish, not pure white, stems with the tomentum matted in resin and not loose, and in a strict sense they are referable to ssp. *gnaphalodes*.
- Ssp. *leiospermus* (Gray) H. & C. Shortleaf rubber rabbitbrush. (*C. n.* var. *abbreviata* [Jones] Blake; *C. leiospermus* [Gray] Greene; *C. n.* var. *leiospermus* [Gray] Hall) Common to abundant (the most common rubber rabbitbrush on the DER) in gravelly washes, rarely on gravelly hills. August through September.
- Chrysothamnus viscidiflorus* (Hook.) Nutt. Low rabbitbrush. With three subspecies on the DER.
- 1 Stems and leaves puberulent ssp. *puberulus*
- 1 Stems and leaves glabrous or at most scabrous, or leaves ciliate
- 2 Leaves about 1 mm wide; involucre somewhat turbinate, with 3-4 (5) flowers ssp. *axillaris*
- 2 Leaves 1-5 mm wide, if only 1 mm then involucre narrowly cylindrical, with 4 or more flowers ssp. *viscidiflorus*
- Ssp. *axillaris* (Keck) L. C. Anderson Narrowleaf rabbitbrush. (*C. v.* ssp. *stenophyllus* H. & C. misapplied [plants from the type locality identical to those of ssp. *viscidiflorus*]; *C. v.* var. *stenophyllus* [Gray] Hall misapplied). Occasional in valleys and on fans.
- Ssp. *puberulus* (D.C. Eaton) H. & C. Hairy low rabbitbrush. (*C. puberulus* [D.C. Eaton] Greene; *C. v.* var. *puberulus* [D.C. Eaton] Jeps.). Occasional on hills and fans.
- Ssp. *viscidiflorus* Stickleaf low rabbitbrush. (*C. pumilus* Nutt.; *C. v.* ssp. *pumilus* H. & C.; *C. v.* var. *pumilus* [Nutt.] Jeps.; *C. stenophyllus* [Gray] Greene; *C. v.* ssp. *stenophyllus* H. & C.; *C. v.* var. *stenophyllus* [Gray] Hall) Occasional or locally common, restricted to sandy soil in Pine Valley near the east boundary of the DER. August through October.

**Cirsium Mill
Thistle**

Cirsium neomexicanum Gray Lavender thistle. Biennial, spiny herbs from taproots, 60-150 cm tall; leaves 2-35 cm long, the lower much longer than the upper ones, alternate, pinnately lobed or divided, white tomentose at least below, the margins spiny; heads 20-30 mm high, the bracts spine-tipped; ray flowers lacking; disc flowers creamy-white; pappus of plumose bristles. Infrequent or locally common, mostly in hills. June through July.

**Enceliopsis (Gray)
A. Nels.**

Enceliopsis nudicaulis (Gray) A. Nels. Barestem enceliopsis. Perennial herbs, 10-43 cm tall; herbage silvery-white with dense pubescence; leaves all basal, the petioles 7-17 cm long, the blades 2-9 cm long, entire, heads solitary on a naked or bracteate scape; involucre 13-22 mm high; ray flowers yellow, 22-38 mm long; disc flowers yellow; pappus usually of 2 awns. Occasional to common on rocky outcrops and gravelly or rocky ground in hills. May through June.

**Erigeron L.
Fleabane; Daisy**

Perennial herbs; leaves alternate or nearly all basal, entire, mostly linear to oblanceolate, heads mostly solitary or few; ray flowers usually well developed, white, pink, blue, or lavender; disc flowers yellow; pappus of capillary bristles.

- 1 Leaves all or nearly all basal, 4-20 mm long, 0.5-1.5 mm wide; plants pulvinate caespitose, 2-7 (10) cm tall *E. compactus*
- 1 Leaves not all basal, some usually over 20 mm long or over 1.5 mm wide or both; plants sometimes caespitose but hardly pulvinate, of various stature
 - 2 Hairs widely spreading (about 60°-90°) from the stem; plants common and widespread *E. pumilus*
 - 2 Stems with appressed hairs or glandular-scabrous; plants known from Tunnel Springs Mountain
 - 3 Herbage glandular-scabrous, sometimes sparingly strigose also, greenish, more or less malodorous *E. nauseosus*
 - 3 Herbage densely pubescent, grayish or whitish
 - 4 Involucres 3.5-5 mm high, the bracts in a single series, glandular, with spreading hairs; ray flowers 4-8 mm long, 1-1.7 mm wide; plants 3-10 (15) cm tall, found mostly above 8,000 ft *E. tener*
 - 4 Involucres 5.5-9 mm high, the bracts imbricate in 2-3 series, not glandular, with appressed hairs; ray flowers 9-15 mm long, 1.5-2.8 mm wide; plants 9-30 cm tall, mostly below 8,000 ft *E. argentatus*

Erigeron argentatus Gray Silver daisy. Infrequent to locally common on Tunnel Springs Mountain. May through June.

Erigeron compactus Blake var. *compactus* Pulvinate daisy. Locally common in a few places on the east side of Tunnel Springs Mountain; mahogany-pinyon-juniper communities. May through June.

Erigeron nauseosus (Jones) A. Nels. Marysvale daisy. Rare on quartzite outcrops of Tunnel Springs Mountain. May through June.

Erigeron pumilus Nutt. ssp. *concinoides* Cronq. Low fleabane, vernal daisy. (*E. concinnus* [H. & A.] T. & G.) The common daisy of the DER, mostly in hills. May through June.

Erigeron tener Gray Slender or thin daisy. Locally occasional to common in a few places at the upper elevations of Tunnel Springs Mountain. May through June.

***Grindelia* Willd.
Gumweed;
Resinweed**

Grindelia squarrosa (Pursh) Dunal var. *serrulata* (Rydb.) Steyermark Strongly resinous, biennial or short-lived perennial herbs, from taproots, 10-70 cm tall; leaves alternate, entire to toothed; involucre 7-9 mm high, the bracts imbricate, often strongly recurved or reflexed from the base; ray flowers yellow, 7-15 mm long; disc flowers yellow; pappus of 2-3 (6) deciduous awns. Known from along Highway 21 near Halfway Summit, to be expected elsewhere along roads. June through October.

***Gutierrezia* Lag.
Snakeweed**

Gutierrezia sarothrae (Pursh) Britt. & Rusby Broom snakeweed. (*Xanthocephalum sarothrae* [Pursh] Shinnery) Short-lived perennial forbs or subshrubs, 10-30 cm tall, rarely taller on the DER; leaves alternate, linear, entire, the main ones often with fascicles of secondary leaves in the axils; heads several to many; involucre 3-5 mm high, the bracts imbricate; ray flowers 3-7, yellow, 2-5 mm long; disc flowers yellowish; pappus of 8-10 scales. Common to abundant, widespread, mostly in valleys, but also in hills, especially common along roads and areas disturbed by rodents. July through September, some leaves remain green through much of the winter. The presence and persistence of snake-weed in plant communities at the DER is not related to grazing. Little used by sheep in winter, but important feed for antelope year around.

***Haplopappus* Cass.
Goldenweed**

Perennial forbs or shrubs; leaves alternate or nearly all basal, mostly entire; heads mostly solitary or few; the bracts more or less imbricate but not in vertical rows; ray flowers usually well developed, yellow; disc flowers yellow; pappus of numerous capillary bristles.

- 1 Plants herbaceous above ground level with a woody branching caudex; leaves 3-60 mm long, in a basal tuft and sometimes reduced in size or number upward on the stem; ray flowers 8-12 mm long *H. acaulis*
- 1 Plants shrubs, woody above ground level; leaves not in a basal tuft, 3-28 mm long, not much if any reduced in size or number upward on the stems; ray flowers 2-6 mm long
 - 2 Leaves densely stipitate-glandular, oblanceolate, acute, the margins not especially wavy; plants of upper parts of Tunnel Springs Mountain; ray flowers 4-6 mm long *H. watsonii*

- 2 Leaves lacking stipitate glands, narrowly oblanceolate or if oblanceolate then the margins rather wavy; plants of various distribution; ray flowers 2-4 mm long
- 3 Leaves 2-5 mm wide, oblanceolate, often wavy margined; twigs (not leaves) more or less stipitate-glandular *H. cervinus*
- 3 Leaves 0.5-2 mm wide, narrowly oblanceolate to oblong, not wavy margined; twigs resinous but not stipitate-glandular *H. nanus*

Haplopappus acaulis (Nutt.) Gray var. *glabratus* D.C. Eaton Stemless goldenweed. (*Aplopappus acaulis* [Nutt.] Blake) One of the most common forbs on hills of the DER, sometimes also on banks of washes. May through June.

Haplopappus cervinus Wats. (*Aplopappus cervinus* Wats.) Occasional in rock crevices and rocky places, the few specimens seen are from Tunnel Springs Mountain. August through October.

Haplopappus nanus (Nutt.) D.C. Eaton in Wats. Dwarf goldenweed. (*Aplopappus nanus* [Nutt.] D.C. Eaton) Occasional to abundant, crevices of rock outcrops and in rocky places in hills. August through October.

Haplopappus watsonii Gray Watson goldenweed. (*Aplopappus watsonii* Gray) Infrequent to occasional in rocky places on Tunnel Springs Mountain. August through October. Some of our specimens are somewhat intermediate to *H. cervinus*.

***Helianthus* L.
Sunflower**

Helianthus annuus L. Common sunflower, wild sunflower. Annual herbs, 30-100 cm tall, rarely taller on DER; lower leaves opposite, upper ones alternate, 3-20 (to 40, but doubtfully this long on DER) cm long, the blades more or less ovate; heads 1-few; involucre bracts imbricate; ray flowers yellow, 1.5-3 (4) cm long; disc flowers blackish or dark reddish-purple; pappus of 2 awnlike scales. More or less weedy along roadsides in some years, not common. June through September.

***Hymenopappus*
L'Her.
*Hymenopappus***

Hymenopappus filifolius Hook. var. *nanus* (Rydb.) Turner Fineleaf hymenopappus. Perennial herbs, 10-30 cm tall, from a caudex, the crown with tufts of woolly or tomentose hair; leaves mostly basal, a few alternate, usually twice-pinnatifid into filiform segments, white pubescent; heads solitary to several, the involucre bracts in 1-2 nearly equal series; ray flowers lacking; disc flowers yellow; pappus of 10-20 minute hyaline scales, these sometimes obscured by the long hairs of the achenes. Occasional, hills, gravelly parts of fans, and shallow soils over bedrock. May through June. Used by antelope in spring and early summer.

***Hymenoxys* Cass.
Actinea; *Hymenoxys***

Caespitose glabrate to densely long-hairy, perennial herbs (ours), with tufts of woolly hair among the leaf bases; leaves basal or alternate; involucre bracts in 2 or 3 series; ray and disc flowers yellow; pappus of 5-8 scales.

1 Leaves all basal, simple, linear or nearly so, entire; heads solitary on simple scapes *H. acaulis*

1 Leaves basal and on stems, pinnately divided into 3-7 linear segments about 1-3 cm long, occasionally a few simple; heads solitary to several *H. richardsonii*

Hymenoxys acaulis (Pursh) Parker var. *acaulis* Stemless hymenoxys. (*Actinea acaulis* Spreng.; *A. depressa* [T. & G.] Kuntze) Common, widespread, hills and washes. April through June.

Hymenoxys richardsonii (Hook.) Cockerell Pinque hymenoxys. (*Actinea richardsonii* [Hook.] Kuntze) Locally common at Halfway Summit and rarely in washes and drive-ways. July through September.

***Leucelene* Greene**

Leucelene ericoides (Torr.) Greene Heath aster. (*Aster arenosus* Blake; *A. bellus* Blake; *A. hirtifolius* Blake; *A. leucelene* Blake) Perennial herbs, 5-12 cm tall, with tufted stems; leaves 2-12 (20) mm long, 0.6-2 mm wide, linear, entire, hispid, ciliate, reduced upward on the stem; heads solitary, the bracts imbricate in about 3-7 series; ray flowers to 6 mm long, white; disc flowers yellow, whitish in age; pappus of capillary bristles. Widespread, mostly occasional in small patches, hills, valleys, and washes. June through August.

***Machaeranthera*
Nees. *Tansyaster***

Annual or perennial herbs; leaves alternate, simple, spinulose toothed; heads various; involucre bracts imbricate; ray flowers various; disc flowers yellow; pappus of capillary bristles.

- 1 Ray flowers 5-12 mm long, white, pink, or lavender; plants annual or biennial or short-lived perennial from a taproot, mostly of valleys *M. canescens*
 1 Ray flowers lacking; plants perennial from a branched caudex, mostly of hills *M. grindelioides*

Machaeranthera canescens (Pursh) Gray Hoary aster. (*M. leucanthemifolia* [Greene] Greene; *Aster canescens*; *A. leucanthemifolia* Greene) Occasional to common, widespread in valleys and hills. July through September in years with summer moisture. Plants of the DER are more or less referable to var. *leucanthemifolia* (Greene) Welsh. The basal leaves remain green in winter, or at least in the early part of winter.

Machaeranthera grindelioides (Nutt.) Shinnery Discoïd machaeranthera. (*Aplopappus nuttallii* T. & G.; *Haplopappus nuttallii* T. & G.) With 2 vars. on the DER.

- 1 Plants depressed, rarely over 5 cm tall; mostly with only 1 head, common, wide-spread; leaves mostly clustered at the base of the plant var. *depressa*
 1 Plants not depressed, mostly over 5 cm tall, with 1 or more heads, rather rare, on Tunnel Springs Mountain; leaves not clustered at base of plant var. *grindelioides*

Var. *depressa* (Maguire) Cronq. & Keck. (*Haplopappus nuttallii* var. *depressa* Maguire) Occasional to locally common, widespread, on semibarren knolls and hills. June through July.

Var. *grindelioides* Rather rare or locally common in rocky places, known from the east side of Tunnel Springs Mountain. July through August.

***Malacothrix* DC.
Desert Dandelion**

Annual herbs with milky juice; leaves basal and alternate, mostly pinnatifid; heads solitary to several, the principal involucre bracts in 1-2 series, with several shorter outer ones; ray flowers yellow; disc flowers none; pappus of capillary bristles.

- 1 Leaves with lateral lobes regularly toothed; involucre usually less than 1 cm long; achenes 2-3 mm long at maturity; pappus bristles all quickly deciduous; herbage glabrous or with few glandular hairs *M. sonchoides*
 1 Leaves with lateral lobes irregularly toothed or lobed; involucre usually over 1 cm long; achenes 3-4 mm long at maturity; pappus mostly quickly deciduous, but 1 or more bristles persistent; herbage often with scattered stipitate-glandular hairs *M. torreyi*

Malacothrix sonchoides (Nutt.) T. & G. Infrequent or occasional, a summer annual not seen in every year, mostly in valleys on sandy soil. May through June. See *M. torreyi*.

Malacothrix torreyi Gray Infrequent or occasional, a summer annual not seen in every year, mostly in valleys. May through June. Easily confused with *M. sonchoides* and rather tenuously separated without mature achenes and pappus.

***Perityle* Benth.
Rockdaisy**

Perityle stansburyi (Gray) Macbr. Stansbury rockdaisy. (*Laphamia stansburyi* Gray) Perennial subshrubs, 7-30 cm tall; stems usually several; leaves mostly alternate, but a few sometimes opposite, 3-14 mm long, glandular-hirtellous; heads few to many, the involucre 5-6.5 mm high; the bracts in 1 or 2 subequal series; ray flowers yellow, 4-5 mm long; disc flowers yellow; pappus of 1 stout bristle and a short crown of hyaline scales. Infrequent or occasional, rocky places in hills. June to mid-July.

***Petradoria* Greene
Rock Goldenrod**

Petradoria pumila (Nutt.) Greene (*Solidago petradoria* Blake) Plants perennial, tufted, herbaceous above ground level, from woody, branching caudices, 10-20 cm tall, glabrous or scabrous, more or less resinous; leaves simple, alternate, entire, linear oblanceolate, often 3-nerved, reduced in size and number upward on the stem; heads few to several; involucre about 5-6 mm high, the bracts more or less imbricate in vertical rows; ray flowers (0) 1-3, usually inconspicuous, yellow; disc flowers few, yellowish; pappus of capillary bristles. The one specimen (W. P. Cottam, 31) seen is from T25S, R18W and is possibly from the DER.

***Prenanthes* Rydb.**

Prenanthes exigua (Gray) Rydb. (*Lygodesmia exigua* Gray) Annual herbs, 5-15 cm tall, rarely taller, branched; milky juice; leaves alternate; toothed to pinnatifid, withered by flowering time; heads at the ends of branches, the involucre 4-5 mm high, the bracts in 2 series (the outer ones 1-few and much reduced, the inner ones 4-5); ray flowers pink or rose, about 7 mm long; disc flowers none; pappus of capillary bristles. Infrequent or occasional in some years, the few specimens seen are from Warm Cove Ridge. May through June or into July.

Senecio L.
Groundsel

Senecio multilobatus T. & G. ex Gray Lobeleaf groundsel. (*S. millelobatus* Rydb.; *S. uintahensis* [A. Nels.] Greenm.) Biennial or short-lived perennial herbs, 10-40 cm tall; leaves alternate, pinnately divided, the segments again variously toothed or lobed; heads few to several, the involucre 4-9 mm high, the bracts in 1 series, sometimes with smaller bracts at base; ray flowers yellow, 4-10 mm long; disc flowers yellow; pappus of numerous capillary bristles. Rare or infrequent along or near Mountain Home Wash. Common in the Mountain Home Range (the apparent seed source for the DER), but probably maturing on the DER only in exceptionally moist years.

Stephanomeria
Nutt. Wirelettuce

Stephanomeria exigua Nutt. Annual herbs from slender taproots, 5-40 cm tall, erect, commonly branched; stems often hollow; main leaves 1-6 cm long, pinnatifid, withered and often deciduous by flowering time; leaves of upper parts of stems reduced and bract-like, toothed to entire; involucre 5-10 mm high; ray flowers 3-5, pink or white, 3-5 mm long; pappus-bristles of plumose in the upper half. Rare, not seen in most years. The few specimens seen are from fans and valleys.

Stephanomeria pauciflora (Torr.) A. Nels in Coult & Nels. has been found just south of the DER in Pine Valley. This is a perennial with pappus-bristles plumose to well below the middle.

Tetradymia DC.
Horsebrush

Shrubs with stems more or less tomentose at least when young; leaves alternate, solitary or fascicled, entire, narrow, the primary leaves sometimes modified into spines; heads axillary or clustered at the tips of branches; involucre bracts 4-6, in a single row, about equal; ray flowers lacking; disc flowers yellow; pappus of numerous, whitish, capillary bristles.

- 1 Twigs densely, uniformly, and permanently tomentose, sometimes with recurved spines, these 5-10 (15) mm long; heads solitary or in pairs in the axils of upper leaves; involucre bracts 5-6, tomentose *T. spinosa*
- 1 At least some of the older twigs tomentose in lines with glabrous lines or glabrate in age; spines if present not recurved; heads (2) 3-many at the ends of twigs; involucre bracts 4 (5)
 - 2 Twigs armed; spines spreading, rigid, not confined to current year's twigs, 5-25 mm long; involucre bracts tomentose *T. nuttallii*
 - 2 Twigs unarmed or the leaves of current twigs persisting, appressed or ascending, and weakly spinescent, to 8 mm long; involucre bracts glabrous *T. glabrata*

Tetradymia glabrata Gray Littleleaf horsebrush. Dominant on large areas of ancient alluvial surfaces south of Tunnel Springs Mountain, also common on coarse volcanic soils. Late May through June, among the earliest of shrubs to become noticeably green at the end of winter, leaves and fruit usually deciduous by July 1. Used by pronghorn antelope in early spring. Known to be poisonous to sheep.

Tetradymia nuttallii T. & G. Nuttall horsebrush. Dominant on ancient alluvium south of Tunnel Springs Mountain, less frequent than *T. glabrata* (the two species seem to occupy the same sites). Late May through June, growth starts early in spring, leaves and fruit usually deciduous by July 1.

Tetradymia spinosa H. & A. Cottonthorn horsebrush. Widespread but scattered, mostly occurring as lone plants in association with plants of other species, in a number of plant communities on alluvial soils.

Townsendia Hook.

Townsendia florifer (Hook.) Gray Showy townsendia, Townsend aster. Winter annual or biennial herbs, 3-10 (15) cm tall; leaves basal and alternate, 6-50 mm long, entire; heads solitary or few; involucre 6-13 mm high, the bracts in 3 or 4 series; ray flowers white, pink, or lavender, 7-12 mm long; disc flowers yellow; pappus of slightly dilated bristlelike scales. Common but scattered in several plant communities, flowering in most years. May through June.

BORAGINACEAE: BORAGE FAMILY

Annual or perennial herbs, with coarse-pubescent herbage; leaves alternate, entire; flowers with united corolla; fruit of nutlets.

- 1 Plants perennial or biennial *Cryptantha*
- 1 Plants annual

Cryptantha Lehm.
Cryptantha

- 2 Plants prostrate-spreading, dichotomously branched, of sandy ground, rare; leaves 4-8 mm long, ovate to nearly suborbicular, with 2-3 distinct pairs of veins on the back; style 2-cleft, stigmas 2 *Tiquilia*
- 2 Plants ascending or erect, if prostrate then not dichotomously branched; at least some of the leaves over 8 mm long, mostly linear or at least narrower than ovate, not distinctly veined, except for the midrib; style not cleft; stigmas 1
- 3 Nutlets with prickles *Lappula*
- 3 Nutlets without prickles *Cryptantha*

In addition to the taxa treated below *C. cinerea* (Greene) Cronq. (*C. jamesii* [Torr.] Payson; *Oreocarya cinerea* Greene) might be found on the DER. This is a perennial with smooth nutlets and whitish corollas.

- 1 Plants biennial or perennial; corollas comparatively large, the limb 4.5-12 mm wide, the tube 2-13 mm long
- 2 At least some of the styles exceeding the mature fruit by 4 mm or more, about equal to the calyx through all stages of phenology; corollas white to yellow, the limb 8-12 mm wide, the tube 7-13 mm long, exceeding the calyx; plants about 10-30 cm tall
- 3 Corollas bright yellow; nutlets smooth; plants about 13-28 cm tall *C. confertiflora*
- 3 Corollas white or cream-yellow, the tube with an orange or dark yellow crest; nutlets muricate or tuberculate; plants seldom over 16 cm tall *C. flavoculata*
- 2 Styles equaling or exceeding the mature nutlets by less than 4 mm; shorter than the calyx through all stages of phenology; corollas whitish, the limb 4.5-10 mm wide, the tube 2-4.5 mm long, only equaling the calyx; plants 3-10 (15) cm tall
- 4 Plants biennial or short-lived perennial, from a simple taproot, without a branched caudex; ventral surface of nutlets smooth or nearly so *C. rugulosa*
- 4 Plants perennial, from taproots to much-branched caudices; ventral surface of nutlets rugose or variously roughened
- 5 Plants compact caespitose, 3-10 cm tall; leaves 5-25 mm long; corolla tube 1.8-2.2 mm long; caudex often with blackish epidermis *C. compacta*
- 5 Plants not or weakly caespitose, 4-15 cm tall; leaves 25 mm long or longer; corolla tube 3-5 mm long; caudex if present usually not with blackish epidermis *C. humilus*
- 1 Plants annual; corollas small, the limb 1-3 mm wide, the tube mostly not over 3 mm long
- 6 Plants 2-5 (10) cm tall, usually several stemmed or at least much branched, often forming a dense hemispherical mass; leaves 3-15 mm long; upper half of calyx falling away at maturity; nutlets smooth or nearly so *C. circumscissa*
- 6 Plants (7) 10-20 cm tall, with solitary or few simple to somewhat branched stems; leaves 10-25 (40) mm long; calyx persistent; nutlets various
- 7 Nutlets 4, 3 with winged margins and 1 wingless; lower surface of leaves conspicuously pustulate *C. pterocarya*
- 7 Mature nutlets 1 or rarely 2-3, not winged-margined; leaves mostly inconspicuously pustulate
- 8 Nutlet smooth and shiny; calyx not bent *C. gracilis*
- 8 Nutlet roughened; calyx bent *C. recurvata*

Cryptantha circumscissa (H. & A.) Johnston. Matted cryptantha. (*Greeneocharis circumscissa* [H. & A.] Rydb.) Occasionally common, but not seen in most years, mostly in valleys. May through June.

Cryptantha compacta Higgins. Compact cryptantha. Occasional in hills. Late April through June.

Cryptantha confertiflora (Greene) Payson. Yellow cryptantha. (*Oreocarya confertiflora* Greene) Occasional on fans and hills. May through June.

Cryptantha flavoculata (A. Nels.) Payson. Roughseed cryptantha. (*Oreocarya flavoculata* A. Nels.; *O. shockleyi* Eastw.) Occasional to locally common in hills. April through June.

Cryptantha gracilis Osterh. Slender cryptantha. The one specimen seen is from Tunnel Springs Mountain, from duff in shade of pinyon and juniper. May through June.

Cryptantha humilis (Gray) Payson var. *commixta* (Macbr.) Higgins (*Oreocarya commixta* Macbr.; *C. nana* [Eastw.] Payson var. *commixta* [Macbr.] Payson) Occasional, valleys and hills. May through June.

Cryptantha pterocarya (Torr.) Greene Winged cryptantha. The few specimens seen are from Tunnel Springs Mountain and Warm Cove Ridge. May through June.

Cryptantha recurvata Cov. Recurved cryptantha. Infrequent or locally common at least in some years, specimens seen are from Antelope Valley and Halfway Hills. May through June.

Cryptantha rugulosa (Payson) Payson The two records seen are from Bullgrass Knoll and Tunnel Springs Mountain. May through June.

***Lappula* Monch
Stickseed**

Lappula redowskii (Hornem.) Greene Annual stickseed. (*L. occidentalis* [Wats.] Greene) Annual herbs (5) 10-30 cm tall, more or less canescent with strigose and villous hairs; leaves 1-3 cm long, linear to oblanceolate; corollas white or blue, inconspicuous, the limb 2-4 mm wide; nutlets 3-4 mm long, with rows of slender, hooked bristles along the margins. One of the most common winter annuals across the DER, most common on roadsides and other areas of disturbance. April to early June.

***Tiquilia* Persoon**

Tiquilia nuttallii (Hook.) Richardson Nuttall coldenia. (*Coldenia nuttallii* Hook.) Annual, prostrate, dichotomously branched, finely strigose; leaves constricted to distinct petioles as long or longer than the blades; corollas pink or white, inconspicuous; the limb 2-2.5 mm wide; nutlets smooth and shining. Present, but rare, in occasional years at DER, absent in most years. May through June.

BRASSICACEAE (CRUCIFERAE); MUSTARD FAMILY

Annual or perennial herbs, glabrous or often pubescent with simple, forked or stellate hairs; leaves alternate or basal, simple to compound, the stem leaves sometimes sessile and auriculate; flowers mostly in racemes, bisexual, regular or nearly so, the petals and sepals 4 and separate or petals sometimes lacking, stamens 6; ovary superior; fruit (pods) linear and many times longer than wide (silique) or not linear and only 1-3 times longer than wide (silicle).

- 1 Key to genera, based largely on features of the mature or nearly mature fruit KEY 1
- 1 Key to genera, based primarily on features of the leaves and flowers ALTERNATE KEY 1

Key 1

- 1 Leaves pinnately compound or pinnatifid into fine segments, the segments mostly not over 3 mm wide; petals 1.5-3 mm long or lacking; plants annual or biennial, rarely perennial
 - 2 Plants stellate-pubescent, mostly 10-40 cm tall, annual; leaves once, twice, or more pinnatifid; petals yellowish; fruit 3-30 mm long *Descurainia*
 - 2 Plants glabrous or with simple hairs, 2-10 (15) cm tall; winter annual, biennial, or rarely short-lived perennial; leaves once pinnately divided; petals whitish; fruit 2.5-4 mm long *Lepidium*
- 1 Leaves not pinnatifid, or if so then the segments over 3 mm wide; petals various but sometimes over 3 mm long; plants various
 - 3 Fruit not linear, only 1-4 (5) times longer than wide, 2.5-17 mm long; petals white or yellow
 - 4 Styles 2-8 mm long; plants covered with dense, appressed, many-rayed, stellate hairs; petals 5-13 mm long, yellow; leaves simple, entire, not auriculate clasping; pods more or less inflated; plants perennial
 - 5 Fruit excluding the style 11-17 mm long at maturity, strongly inflated, obcordate or deeply indented at apex, the styles 4-8 mm long; petals 8-13 mm long; leaves 3-35 mm wide *Physaria*
 - 5 Fruit excluding the style 3-6 mm long, slightly inflated, pointed at the apex; styles 2-4 mm long; petals about 6-8 mm long; leaves 2-6 mm wide *Lesquerella*
 - 4 Styles less than 2 mm long; plants variously pubescent but not as above; petals 2-5 mm long, or obsolete, white to cream; leaves various; pods not or obscurely inflated; plants annual, winter annual, or biennial
 - 6 Leaves entire or with small teeth

- 7 Plants 2-5 (10) cm tall, native, pubescent with stalked 2-4 rayed hairs; stem leaves not auriculate *Draba*
- 7 Plants 10-30 cm tall or taller, introduced, pubescent with simple, forked or stellate hairs; at least the upper leaves auriculate *Camelina*
- 6 At least some of the leaves pinnately lobed or divided *Lepidium*
- 3 Fruit linear, over 5 times longer than wide, (10) 15-140 mm long; petals various
- 8 Petals yellow, 10-28 mm long; plants either pubescent with pick-shaped hairs or pods stipitate
- 9 At least some of the lower leaves pinnatifid, 5-18 cm long, 2-5 cm wide; stamens exserted, the filaments about twice as long as the petals; pods stipitate, the stipe 1-2.5 cm long; plants 25-80 cm tall or taller, glabrous to pilose with simple hairs, glaucous *Stanleya*
- 9 Leaves entire, 2-5 (10) cm long, 0.2-1.4 cm wide; stamens included; pods sessile; plants mostly 10-30 cm tall, rarely taller; pubescent with pick-shaped hairs *Erysimum*
- 8 Petals white, pink or purplish but not yellow, mostly less than 10 mm long; plants glabrous or variously pubescent but not with pick-shaped hairs; pods not stipitate
- 10 At least some of the leaves pinnatifid, not auriculate; stems either inflated or strongly pilose; pods 7-14 cm long *Caulanthus*
- 10 Leaves not pinnatifid, those of the stem auriculate or not; stems not inflated, not pilose; pods (1) 2-8.5 cm long
- 11 Leaves dentate-toothed toward the apex, entire toward the base, obovate to lanceolate, those of the stem strongly auriculate; plants glabrous; pods 5-8.5 cm long, 3-5 mm wide *Streptanthus*
- 11 Leaves not dentate-toothed toward the apex, usually narrower than above, if auriculate then plants pubescent with forked branched or stellate hairs; pods (1) 2-6.5 cm long, less than 3 mm wide
- 12 Plants glabrous, annual; pods reflexed-descending *Streptanthella*
- 12 Plants pubescent with forked, branched, or stellate hairs, perennial or annual; pods descending to erect
- 13 Pedicels of fruit 1-2 mm long; plants annual, introduced, weedy ...
..... *Malcolmia*
- 13 Pedicels of fruit 3-20 mm long; plants perennial, native, not weedy
..... *Arabis*

Alternate Key 1

- 1 Plants glabrous or with simple hairs only
- 2 Leaves all entire, not auriculate at the base *Streptanthella*
- 2 At least some of the leaves toothed, lobed, or pinnatifid
- 3 Leaves toothed at the apex, not lobed, those of the stem strongly auriculate-clasping *Streptanthus*
- 3 At least some of the leaves lobed or pinnatifid, not auriculate at the base (the upper ones cordate-clasping in *Lepidium perfoliatum*)
- 4 Plants 2-20 cm tall, annual or winter annual; leaves to 3.5 cm long, or if longer then tripinnatifid *Lepidium*
- 4 Plants (20) 30-80 cm tall, annual or perennial; leaves often 3-15 cm long, lobed or once pinnatifid
- 5 Plants glabrous or nearly so, glaucous, perennial; stems not inflated; petals bright yellow *Stanleya*
- 5 Plants hirsute with spreading hairs or if glabrous then stems inflated; petals purplish or brownish *Caulanthus*
- 1 Plants pubescent with forked, branched, or stellate hairs
- 6 Leaves dissected into numerous fine segments *Descurainia*
- 6 Leaves entire to toothed
- 7 Leaves sessile and auriculate at the base
- 8 Plants annual, introduced *Camelina*
- 8 Plants perennial, native *Arabis*
- 7 Leaves petioled or sessile but not auriculate at the base
- 9 Plants perennial, grayish or whitish, covered with dense, overlapping, appressed, stellate hairs; leaves elliptic to broadly oblanceolate, more or less constricted to a petiole; petals yellow

- 10 Blades of lower leaves 4-10 mm long, 2-6 (10) mm wide; petioles 4-15 mm long, rarely longer *Lesquerella*
- 10 At least some of the lower leaves larger than above *Physaria*
- 9 Plants annual, biennial, or short-lived perennial, if perennial then leaves linear to narrowly oblanceolate and sessile or gradually tapered to an indistinct petiole; pubescence of forked, pick-shaped or branched hairs
- 11 Plants annual with forked or branched hairs; leaves sometimes toothed; petals white or purple
- 12 Leaves crowded at the base of the plant; plants 2-5 (7) cm tall, native; petals white *Draba*
- 12 Leaves not crowded at base of plant; plants 3-25 cm tall, introduced, weedy on disturbed sites; petals purple *Malcolmia*
- 11 Plants biennial or short-lived perennials with pick-shaped hairs that are attached near the middle with a short stalk (the stalk serves as a pivot and when one end of the hair is moved the opposite end moves about an equal distance—a feature not easily detected without a dissecting scope); petals yellow *Erysimum*

Arabis L. Rockcress

Perennial herbs usually with at least some forked, branched, or dendritic hairs; leaves alternate, entire or inconspicuously toothed; petals white, pink, or purple; fruit linear, many-seeded.

- 1 Lower leaves hirsute-ciliate with simple or once-forked hairs; stems and leaf surfaces glabrous or with simple or forked hairs; pods 1-4 cm long, pendulous; pedicels and fruit glabrous; plants rare on DER; petals about 5-7 mm long *A. pendulina*
- 1 Lower leaves not ciliate exclusively with simple or once-forked hairs; lower part of stems and leaf surfaces of at least lower leaves with forked, branched, or dendritic hairs; pods various; petals various; pedicels and fruit glabrous or pubescent
 - 2 Stem leaves not auriculate, not crowded; basal rosette of leaves poorly developed; petals 9-11 mm long, lavender to purple; herbage and usually the pedicels, ovaries, and pods densely pubescent with minute dendritic hairs; pods 35-65 mm long, pendulous to reflexed *A. pulchra*
 - 2 Stem leaves auriculate, sometimes crowded; basal rosette mostly well developed; petals 5-10 mm long, pink to lavender; pubescence not as above except in *A. shockleyi* and then the basal rosette well developed
 - 3 Herbage, pedicels, and sometimes fruit densely pubescent with minute soft hairs; petals 7.5-10 mm long; pods 42-65 mm long, ascending to spreading; leaves and fruit usually densely crowded *A. shockleyi*
 - 3 Pubescent different from above in one or more ways; petals 5-9 mm long; pods 20-65 mm more or less spreading-pendulous; leaves crowded or not
 - 4 Stems usually 3 or more, arising from between the basal rosette and a secondary tuft of leaves *A. perennans*
 - 4 Stems usually solitary or to 3, arising from the basal rosette, the secondary tuft of leaves lacking *A. lignifera*

Arabis lignifera A. Nels. Woody rockcress. Occasional in hills.

Arabis pendulina Greene The two records seen are from the east side of Tunnel Springs Mountain; pinyon-juniper community. May through June.

Arabis perennans Wats. The few records seen are from Tunnel Springs Mountain and Warm Cove Ridge; pinyon-juniper and desert shrub communities. May through June.

Arabis pulchra Jones var. *munciensis* Jones Beauty rockcress. Infrequent or rare, the two specimens seen are from Warm Cove Ridge and Halfway Hills. May through June.

Arabis shockleyi Munz Shockley rockcress. Infrequent on Tunnel Springs Mountain in pinyon-juniper and mahogany communities. May through June.

Camelina Crantz False Flax

Camelina microcarpa Andr. in DC. Little false flax, hairy false flax. Annual herbs, 8-80 cm tall, with simple, forked, or stellate hairs; leaves entire or obscurely toothed, about 1-8 cm long, at least the upper ones auriculate; petals white or cream, 3-5 mm long; fruit slightly inflated, glabrous, 5-7 mm long, pointed at the tip into a short style. Introduced from Asia, infrequent, more or less weedy about Headquarters and perhaps along roads.

Caulanthus Wats.
Wild Cabbage;
Caulanthus

Herbs; at least the lower leaves pinnatifid, those of the stem petiolate and not auriculate; pods linear, long.

- 1 Plants glabrous and more or less glaucous, mostly winter annual or biennial (on DER) or short-lived perennial (elsewhere); stems usually strongly inflated; petals dull-purplish, 10-14 mm long; stem leaves conspicuously reduced upward on the stem. *C. crassicaulis*
- 1 Plants hirsute to pilose at least below, winter annual or biennial; stems not inflated; petals white, suffused with purple or pink, 7.5-10 mm long; stem leaves only slightly reduced upward. *C. pilosus*

Caulanthus crassicaulis (Torr.) Wats. var. *glaber* Jones Thickstem wild cabbage. Infrequent in some years, the three specimens seen are from near Bullgrass Knoll and east side of Antelope Valley near Tunnel Springs Mountain.

Caulanthus pilosus Wats. Occasional and widely scattered in some years, valleys and fans. May through June.

Descurainia Webb
& Berth. Tansy
Mustard

Winter annual or biennial herbs, usually stellate pubescent; leaves 1-3 times pinnately compound or pinnatifid; petals yellow; fruit linear or linear-elliptic.

- 1 Pods (15) 20-30 mm long; upper as well as lower leaves 2-3 times pinnate; plants introduced. *D. sophia*
- 1 Pods 3-15 mm long; upper leaves only once pinnate; plants native. *D. pinnata*

Descurainia pinnata (Walt.) Britt. (*Sophia pinnata* [Walter] Howell) Pinnate tansy mustard. With two intergrading varieties on the DER.

- 1 Stems and branches stipitate glandular in the inflorescence with tack-shaped hairs; pubescence of leaves often dense enough to give grayish cast to the leaves. var. *osmiarum*
- 1 Plants not glandular, tack-shaped hairs lacking; pubescence of leaves rarely dense enough to give grayish cast to the leaves. var. *intermedia*

Var. *intermedia* (Rydb.) C.L. Hitchc. All specimens seen are from hills and Tunnel Springs Mountain. May through June.

Var. *osmiarum* (Cockerell) Shinnars (*D. p.* var. *halictorum* [Cockerell] Peck) All specimens seen are from Pine Valley, especially in areas of frequent rodent disturbance. May through June.

Descurainia sophia (L.) Webb in Engler & Prantl (*Sophia parviflora* [Lam.] Standl.) Introduced from Eurasia, weedy, most commonly seen near DER Headquarters and occasionally in other areas of supplemental watering (flood plains in valleys at the ends of major washes). May through June.

Draba L.
Whitlow-grass;
Whitlow-wort; Draba

Draba cuneifolia Nutt. ex T. & G. Wedgeleaf draba. Annual herbs 1-5 (10) cm tall; leaves crowded towards the base of stems and sometimes appearing all basal; entire to dentate, hirsute with 2- to 4-rayed hairs and sometimes simple hairs; flowers 3-many; petals 3-5 mm long, white; pods 4-15 mm long, about 2-4 mm wide. Occasional, mostly in swales of hills and fans. March through May.

Erysimum L.
Wallflower

Erysimum asperum (Nutt.) DC. Rough wallflower, prairie rocket. (*E. capitatum* [Dougl.] Greene; *E. argillosum* [Greene] Rydb.; *Cheirinia bakeri* [Greene] Rydb.; *C. elata* (Nutt.) Rydb.; *C. ob lanceolata* Rydb.; *C. wheeleri* [Roth.] Rydb.) Biennial or short-lived perennial herbs, 10-30 cm tall, rarely taller on DER, pubescent with 2-rayed or pick-shaped (malpighian) hairs; leaves entire, 1-5 (10) cm long, mostly linear or at least narrow; flowers usually several; petals yellow, 12-20 (28) mm long; pods 17-60 cm long or longer, many-seeded. Occasional, hills, valleys, and fans. April through June. DER plants are referable to var. *purshii* Durand.

Lepidium L.
Peppergrass;
Pepperweed

Annual, winter annual, biennial, or rarely short-lived perennial plants, glabrous or with simple hairs only; winter rosettes usually well developed, and green through much or all of the winter; leaves pinnately lobed to divided, some usually simple; petals small or lacking; pods ovate to elliptic, short, 2-seeded.

- 1 Upper leaves strongly cordate-clasping, entire, ovate; basal leaves tripinnatifid; petals yellow *L. perfoliatum*
- 1 Leaves not cordate-clasping, the basal ones entire or toothed to once-pinnatifid; petals white or lacking
- 2 Pods not notched at apex, not at all winged; style evident as a point on the pod; petals longer than the sepals; at least some of the lower leaves usually divided to the midrib, the lobes often linear or narrowly oblanceolate; plants annual, biennial (DER), or short-lived perennial (elsewhere) *L. montanum*
- 2 Pods notched at the apex, more or less winged on upper margins; styles not evident, not exceeding the notch; petals obsolete or shorter than the sepals; leaves entire, toothed, or if lobed then not cut more than about half way to the midrib, and the lobes usually rounded; plants annual or winter annual *L. densiflorum*

Lepidium densiflorum Schrad. Prairie pepperweed. Common in some years, disturbed places and near washes. May through June.

Lepidium montanum Nutt. var. *montanum* Mountain pepperweed. (*L. scopulorum* Jones f. *nanum* Thell.; *L. albiflorum* Nels. & Kenn.) Common, widespread through many plant communities in Pine Valley, but seldom abundant except on areas of rodent activity, seen in most years. May to mid-July.

Lepidium perfoliatum L. Clasping pepperweed. Introduced from Europe, infrequent or locally common in some years near Headquarters. May through June.

***Lesquorella* Wats.
Bladderpod**

Lesquerella goodrichii Rollins Perennial herbs, 2-5 (8) cm tall, densely stellate pubescent, stems decumbent to ascending; lower leaves gradually or rather abruptly tapered to a petiole, the blades about 4-10 mm long, 2-6 mm wide, the upper leaves sessile and reduced; petals yellow, 6-8 mm long; fruit 3-6 mm long; style 2-4 mm long. Occasional, Tunnel Spring Mountain, pinyon-juniper and mahogany communities. May through June. The type specimen (Goodrich 16951) is from the DER.

***Malcolmia* (L.) R.
Br. Malcolmia**

Malcolmia africana R. Br. in Ait. African mustard. Annual herbs, 3-40 cm tall, pubescent with forked or 3-rayed hairs; leaves sinuate-dentate, 1.2-9 cm long, 0.3-2.3 cm wide, oblanceolate to elliptic, petioled or sessile, not auriculate; petals 6-10 mm long, pink to lavender; pods 33-66 mm long. Introduced from Africa, weedy, adventive along roads and on other disturbed ground. May through June.

***Physaria* (Nutt.)
Gray Twinpod;
Double Bladderpod**

Physaria chambersii Rollins Great Basin twinpod. (*P. didymocarpa* [Hook.] Gray in part) Perennial herbs, 3-25 cm tall, densely pubescent with stellate hairs; basal leaves 1-8 cm long, 0.3-3.5 cm wide, orbicular to elliptic, entire, or toothed; stem leaves much reduced; petals yellow; pods strongly inflated. Occasional, mostly on hills and upper parts of fans. April to mid-May.

***Stanleya* Nutt.
Prince's Plume;
Stanleya**

Stanleya pinnata (Pursh) Britton. Brushy stanleya. Perennial herbs, the base more or less woody, glabrous to pilose, glaucous; leaves mostly 5-10 (18) cm long, 2-5 cm wide, pinnatifid or the upper ones entire; petals yellow, 11-17 mm long; pods 3-7 cm long. Rare on DER, hills and upper parts of fans, common in volcanic soils of the area. Late May through June.

***Streptanthella*
Rydb. Streptanthella**

Streptanthella longirostris (Wats.) Rydb. Beaked streptanthella. (*Streptanthus longirostris* Wats.) Annual herbs, 10-50 cm tall, glabrous; leaves 1.5-8.5 cm long, 1-12 mm wide, oblanceolate to elliptic or nearly linear, entire to sinuate-dentate; petals 5-8 mm long, white with purplish veins; pods 3-6 cm long, reflexed-descending, with a 3-7 mm long beak. Occasional or infrequent at least in some years, sandy places, valleys, and lower parts of fans. May through June.

***Streptanthus* Nutt.
Streptanthus**

Streptanthus cordatus Nutt. in T. & G. Heartleaved streptanthus. Perennial herbs, glabrous, glaucous, 15-30 (60) cm tall; basal leaves 1.5-8 cm long, 0.5-3 cm wide; dentate at the apex; stem leaves sessile and strongly auriculate; petals 10-15 mm long, purplish to brownish; pods 5-8.5 cm long. Infrequent, the few specimens seen are from Halfway Hills and Tunnel Springs Mountain. May through June. Grazed moderately to heavily by antelope while flowering.

CACTACEAE; CACTUS FAMILY

Plants perennial, succulent, spiny; stems fleshy with a thick epidermis, with areoles (spine-bearing areas); leaves obsolete or lacking; flowers mostly showy, bisexual; petals numerous; stamens numerous; pistil 1, the ovary inferior; style 1, with 4-12 stigmas.

- 1 Stems jointed, the joints (1) 2-several, flattened or cylindrical; areoles bearing both spines and glochids (retrorsely barbed stiff fine hairs), subtended by terete early deciduous green leaves when young *Opuntia*
- 1 Stems not jointed, cylindrical or spherical; areoles borne on ribs or tubercles, with spines or hairs but without glochids
 - 2 Stems longitudinally ribbed, more or less cylindrical, not much if at all buried in the ground; flowers borne on spine-bearing areoles below the apex of the stem; floral tube spiny *Echinocereus*
 - 2 Stems tuberculate (the tubercles more or less spirally arranged), more or less spherical or hemispherical (pincushionlike), often half or more buried in the ground; flowers borne at or near the apex of the stem; floral tube not spiny
 - 3 One of the central spines of at least some areoles hooked; central spines 1-5; radial spines about 5-12 per areole, not obscuring the surface of the stem *Sclerocactus*
 - 3 Spines not hooked, central spines 1-12; radial spines 10-30 per areole, often more or less obscuring the surface of the stem
 - 4 Tubercles grooved; flowers 3.8-5 cm wide, axillary at tubercle base, at end of a felty persistent groove connected to the areole; petals pink-purple to rose, linear-lanceolate, acute *Coryphantha*
 - 4 Tubercles not grooved; flowers less than 3 cm wide, borne at the tubercle apex on one side of areole; petals whitish, pinkish, yellowish, or greenish, wider than lanceolate, rounded at the tip; specimens not seen from the DER but from nearby hills *Pediocactus simpsonii* (Engelm.) Britt. & Rose

Coryphantha Lem. *Coryphantha*

Coryphantha vivipara (Nutt.) Britt. & Rose var. *arizonica* (Engelm.) W. T. Marshall
Cushion coryphantha. Stems more or less spherical or hemispherical, strongly tuberculate, 2-5 cm tall, rarely taller at DER, half or more often buried in the ground; tubercles 6-9 mm long; central spines whitish basally, dark apically, about 12-20 mm long; radial spines 12-20, spreading, obscuring the stem; fruit fleshy, green, ellipsoid, 12-25 mm long. The linear-lanceolate, acuminate petals are unique among the cactuses of the DER. Rare but scattered in a number of plant communities, hills and alluvial fans. June.

Echinocereus Engelm. Hedgehog Cactus; Barrel Cactus

Stems mostly cylindrical and slightly elongate, about 10-15 (20) cm long and 5-8 cm thick (in those at DER), strongly longitudinally ribbed, the ribs parallel; fruit fleshy, spiny, green or red.

- 1 Flowers scarlet-red; stems few to numerous in compact clusters or colonies, to 10 (15) cm tall *E. triglochidiatus*
- 1 Flowers pink-purple to rose; stems solitary or few together, 10-20 cm tall *E. engelmannii*

Echinocereus engelmannii (Parry) Rumpler var. *chrysoctrus* (Engelm. & Bigel.) Engelm. ex Rumpler Infrequent, mostly in coarse gravels of washes in upper parts of fans. Mid-June.

Echinocereus triglochidiatus Engelm. var. *melanacanthus* (Engelm.) L. Benson Claret-cup echinocereus. (*E. coccineus* Engelm.) Infrequent or rare, mostly restricted to cracks in dolomite outcrops. May through June.

Opuntia Mill. Pricklypear

Stems jointed, areoles armed with spines and glochids (small retrorsely barbed stiff hairs), the glochids tufted; flowers borne in areoles of previous year's growth; fruit fleshy or dry.

- 1 Joints cylindrical or club-shaped; spines with detachable sheaths (at least at the apex); fruit fleshy
 - 2 Joints 1-3, rarely more, club-shaped; plants 3-10 cm tall, armed with rather slender spines; petals rose-pink to orchid; fruit red, spiny *O. pulchella*
 - 2 Joints often more than 3, cylindrical; plants 10-60 cm tall, armed with stout spines; petals yellowish-green; fruit yellow, glochidiate *O. whipplei*

1 Joints strongly flattened; spines with persistent sheaths; fruit dry, tan or brown, spiny *O. polyacantha*

Opuntia polyacantha Haw. Plains pricklypear. Not common, but scattered in many plant communities, valleys, benches, and hills. June.

Opuntia pulchella Engelm. Finger cactus, sand cholla. (*Micropuntia barkleyana* Daston; *M. brachyropalia* Daston; *M. spectatissima* Daston) Occasional, widespread, gravelly alluvium and dolomite hillsides. Late May to early June. The stems arise from a tuberous root.

Opuntia whipplei Engelm. & Bigel. var. *whipplei* Whipple cholla. Occasional to locally common on rocky slopes on light colored quartzite of Warm Cove Ridge, also on volcanics just off the DER in Red Hills. June.

***Sclerocactus* Britt.
& Rose
*Sclerocactus***

Sclerocactus pubispinus (Engelm.) L. Benson (*Echinocactus pubispinus* Engelm.; *S. whipplei* [Engelm.] Britt. & Rose) Stems mostly solitary, depressed hemispheric to ovoid, half or more often buried below ground level, 1-5 cm tall, rarely taller on DER, with 6-13 ribs; young spines and often some older ones sparingly to densely white-pubescent; flowers 2.5-3.5 cm long; petals yellow, bronze, pink or violet to rose-purple; fruit dry. Most of the DER material is referable to var. *pubispinus* with flowers bronze to yellow, and with widest upper central spines 0.7-1 mm wide. However, a few specimens seen are transitional to var. *spiniosior* (Engelm.) Welsh, which has flowers rose to violet and widest upper central spines 1-2.2 mm wide. Rare, scattered, hills and upper parts of fans.

CAPPARIDACEAE; CAPER FAMILY

***Cleome* L.
Spiderflower;
Bee-plant**

Cleome serrulata Pursh Bee spiderflower. Annual herbs, 30-80 cm tall or taller; leaves alternate, with 3-7 palmate leaflets, the leaflets 2-7 cm long, lanceolate to oblanceolate, mostly entire; flowers in racemes; petals purplish-pink, occasionally white, 10-12 mm long; stamens long-exserted; fruit (capsule) linear, many seeded, 2.5-6.5 cm long, stipitate, the stipe to as long as the pedicel. Roadsides, rare on DER, common along Highway 21.

CAPRIFOLIACEAE; HONEYSUCKLE FAMILY

***Symphoricarpos*
Duhamel Snowberry**

Symphoricarpos longiflorus Gray Longflower snowberry. Much-branched shrubs, 50-100 cm tall, twigs and leaves opposite; leaves 6-15 mm long, 3-5 mm wide, simple, entire; corollas united, 11-13 mm long, narrow, pink; fruit a berrylike drupe, white, 8-10 mm long. Occasional, among rocks, and on rocky slopes in hills and along washes at upper edge of fans. May through June.

CARYOPHYLLACEAE; PINK FAMILY

Perennial herbs (on DER); leaves opposite, linear; sepals and petals free or petals obsolete.

1 Leaves 3-6 mm long, densely crowded, with prominent scarious stipules; plants not over 5 cm tall, pulvinate caespitose to spreading and mat forming; flowers sessile, inconspicuous, hidden among the leaves; petals obsolete; stamens 5

Paronychia

1 Leaves 10-20 mm long or longer, without scarious stipules; plants 10-20 cm tall, more or less caespitose but not pulvinate; flowers in open cymes, conspicuous, petals more or less showy, about 5-10 mm long, white; stamens 10 *Arenaria*

***Arenaria* L.
Sandwort**

Arenaria kingii (Wats.) Jones Kings sandwort. With features of the family and as listed in the key. Occasional to rather common, widespread in hills. April through June.

***Paronychia* Adans.
Whitlow-wort;
Nailwort**

Paronychia sessiliflora Nutt. Creeping nailwort. With features of the family and as listed in the key. The few specimens seen are from exposed, rocky places on Warm Cove Ridge.

CELASTRACEAE; STAFFTREE FAMILY

Forsellesia Greene Greasebush

Forsellesia nevadensis (Gray) Greene Nevada greasebush. (*Glossopetalon nevadensis* Gray) Spiny much branched shrubs to about 50 cm tall; twigs green, yellowish in age, puberulent; leaves alternate, simple, entire, 5-12 mm long, oblong to oblanceolate; flowers axillary, inconspicuous; petals 4-7 mm long, whitish, quickly deciduous; fruit a follicle to 5 mm long. Common to abundant in hills, mostly on Warm Cove Ridge. May through June.

CHENOPODIACEAE; GOOSEFOOT FAMILY

Shrubs or forbs; leaves mostly alternate, rarely opposite, simple, entire, toothed, or lobed; flowers axillary or more often glomerate in a spicate or racemose to paniculate inflorescence, inconspicuous, perianth of a single set (sepals); stamens generally equal to and opposite the perianth lobes; ovary superior; fruit an utricle.

- 1 Plants annual herbs
 - 2 Leaves glabrous or with nonscurfy hairs, linear to terete, often tipped with a hairlike bristle or spinelike point, not over 3 mm wide, more or less succulent at least when young; fruit with a horizontal wing
 - 3 Leaves 5-10 mm long, tipped with a bristlelike hair, the tip not spiny in age, terete or nearly so; plants not becoming spiny in age, remaining succulent even during flowering and fruiting, well into autumn *Halogeton*
 - 3 Leaves sometimes over 10 mm long, tipped with a sharp point that sometimes becomes spiny in age, terete to linear; plants succulent when young, becoming spiny, hardened as flowering starts in late summer, drying to a tumbleweed *Salsola*
 - 2 Leaves either scurfy or broader than linear and usually both, not tipped with bristlelike hairs or spines; fruit not with horizontal wings
 - 4 Leaves irregularly lobed, at least some of the lobes cut $\frac{1}{4}$ - $\frac{3}{4}$ the way to the midrib; perianth lobes 1 *Monolepis*
 - 4 Leaves entire or lobed less than $\frac{1}{4}$ the way to the midrib
 - 5 Plants pubescent, often densely so *Kochia*
 - 5 Plants glabrous or scurfy
 - 6 Flowers bisexual with a regular (3-4) 5-lobed perianth; leaves entire or with rounded teeth or lobes; seeds blackish and shiny *Chenopodium*
 - 6 Flowers unisexual, the pistillate ones more or less enveloped by 2 bracts; leaves with rather pointed lobes or teeth; seeds not blackish and shiny *Atriplex*
 - 1 Plants perennial shrubs or subshrubs
 - 7 Leaves glabrous, green, fleshy-succulent, linear to subterete, not over 2 mm wide; those persisting into winter dry to black or dark brown; fruit with a horizontal wing
 - 8 Shrubs more or less spiny, 0.3-1 m tall or taller *Sarcobatus*
 - 8 Subshrubs, not over 0.3 m tall *Kochia*
 - 7 Leaves either densely scurfy or otherwise pubescent, whitish or grayish, succulent or not; fruit various
 - 9 Leaves and twigs glabrate to densely tomentose, hirsute or sericeous, but not scurfy; leaves linear or nearly filiform; plants suffrutescent subshrubs
 - 10 Leaves and twigs stellate-tomentose; leaves linear, slightly to strongly revolute, the midnerve conspicuous beneath *Ceratoides*
 - 10 Leaves glabrate to sericeous with simple hairs, terete or nearly so or subulate, often without a conspicuous midnerve *Kochia*
 - 9 Plants scurfy, the hairs inflated and soon collapsing and leaving a grayish or whitish mealy coating on leaves and twigs; leaves linear or broader; plants half shrubs or shrubs
 - 11 Plants mostly spiny; leaves oblanceolate to orbicular
 - 12 Leaves scurfy when young, some of the hairs forked or stellate, glabrate or glabrous and green when mature, mostly oblanceolate to spatulate, deciduous by midsummer; bark of twigs exfoliating in long, white strips; bracts of fruit wholly united into a sac *Grayia*
 - 12 Leaves permanently and densely gray-white scurfy with simple, inflated (but collapsing) hairs, mostly ovate to obovate, most persisting, not

- summer-deciduous; bark not as above; bracts of fruit free toward the apex *Atriplex confertifolia*
- 11 Plants not or only weakly spiny; leaves linear, 3-10 times longer than wide *Atriplex*

***Atriplex* L.
Orache; Saltbush**

Annual herbs to shrubs; leaves mostly alternate, rarely opposite, entire to toothed, densely scurfy, pale gray-green; flowers bisexual, the staminate ones with a perianth, the pistillate without a perianth, but enclosed in two bracts.

- 1 Plants annual herbs; leaves sinuate-dentate the whole length, ovate, elliptic, lanceolate, or nearly rhombic. *A. rosea*
- 1 Plants shrubs or subshrubs
 - 2 Plants spiny; leaves obovate to orbicular *A. confertifolia*
 - 2 Plants not spiny or only weakly so; leaves linear or nearly so
 - 3 Fruiting bracts with 4 wings
 - 4 Fruiting bracts including the wings over 9 mm wide, tips of the bracts not exceeding the wings; staminate flowers yellow; plants shrubs, wide-spread *A. canescens*
 - 4 Fruiting bracts including the wings less than 9 mm wide, tips of bracts exceeding the wings; staminate flowers mostly brownish; plants shrubs or sometimes herbaceous above, restricted to the area of Pine Valley Hardpan *A. bonnevillensis*
 - 3 Fruiting bracts not winged, toothed at apex *A. falcata*

Atriplex bonnevillensis C. A. Hanson Bonneville saltbush. Locally common around Pine Valley Hardpan. July through August. This taxon seems to be of rather recent hybrid derivation involving *A. canescens* and *A. falcata*. The taxon is functional but unstable and shows a range of features that approach those of *A. canescens* on one extreme and those of *A. falcata* on the other. The type specimen (Hanson 354) is from Pine Valley playa. Sheep and cows browse *A. bonnevillensis* while on the DER in winter, and might in summer if they were still there.

Atriplex canescens (Pursh) Nutt. Fourwing saltbush. Occasional to common, mostly in gravelly washes and sandy ground. June. The leaves persist through much or all of winter and the leaves and twigs are grazed by sheep and cattle.

Atriplex confertifolia (Torr. & Frem.) Wats. Shadscale. Common to abundant, many plant communities, valleys, fans, and hills. June. Leaves persist through winter following summers and autumns of greater than normal precipitation. Palatable to sheep, but the growth is not always available, for in years of poor growth the older spines prevent access to the leaves and succulent twigs. Shadscale has increased in abundance under heavy and repeated sheep use. It has become dominant where *Artemisia nova*, *A. spinescens*, and *Ceratoides lanata* have declined under heavy use.

Atriplex falcata (Jones) Standl. (*A. nuttallii* Wats. var. *falcata* Jones; *A. nuttallii* ssp. *falcata* H. & C.) Locally common in the bottom of Pine Valley near the hardpan. June. Used by sheep and cattle.

Atriplex rosea L. Tumbling orache. Introduced from Eurasia, more or less weedy on disturbed ground, rare on DER. August-September

***Ceratoides*
Winterfat; White
Sage; Winter Sage**

Ceratoides lanata (Pursh) J. T. Howell var. *subspinosa* (Rydb.) J. T. Howell (*Eurotia lanata* [Pursh] Moq.) Suffrutescent long-lived subshrubs, 15-30 cm tall, rarely taller on DER; current twigs and leaves densely stellate tomentose and also with longer, simple, straight hairs; leaves simple, alternate, linear or nearly so, 1-4 cm long, revolute, the midnerve conspicuous beneath; flowers inconspicuous, the staminate ones with a 4-parted perianth, the pistillate ones with 2 united pilose bracts; stamens 4; stigmas 2; fruit covered with long soft white hairs. Common, widespread, valleys, fans, and lower hills, sometimes in nearly pure stands on loamy fine sand in valley bottoms. April through June. Starts growth early in spring and grows any time in summer and fall after sufficient precipitation. Years of abundant seed production are rare. In most years palatable winter-long to cattle, sheep, and horses, and every year in late winter and spring. Winterfat endures more severe grazing than other shrubs, but it has declined in number and productivity of surviving plants under severe grazing pressure.

***Chenopodium* L.
Goosefoot; Pigweed;
Lambsquarters**

- Annual herbs; leaves alternate, more or less scurfy; flowers inconspicuous; stamens 1-5; styles usually lacking; stigmas 2-5; seeds blackish, usually shiny.
- 1 Lower leaves more or less cordate to truncate basally, glabrous, green, the margins with large teeth or small lobes *C. hybridum*
 - 1 Leaves not cordate or truncate basally, or if so then usually grayish or whitish scurfy, the margins entire to toothed or hastately lobed
 - 2 Leaf blades lobed toward the base, otherwise entire or the hastate lobes sometimes with a smaller lobe or tooth; pericarp not adherent to the seed . . . *C. fremontii*
 - 2 At least the larger leaves sinuate-dentate above the base, sometimes also sub-hastately lobed toward the base; pericarp adherent to the seed *C. album*

Chenopodium album L. Lambsquarters. Introduced from Eurasia, more or less weedy on disturbed ground. This summer annual is not seen in most years.

Chenopodium fremontii Wats. Fremont goosefoot. (*C. incanum* [Wats.] Heller) More or less weedy on disturbed ground. This summer annual is not seen in most years.

Chenopodium hybridum L. Mapleleaf goosefoot. (*C. gigantospermum* Aellen) The one specimen seen (S. Welsh and G. Moore 3164 BRY) is from the west side of Tunnel Springs Mountain.

***Grayia* H. & A.
Hopsage**

Grayia spinosa (Hook.) Moq. in DC. Spiny hopsage. (*Atriplex spinosa* [Hook.] Collotzi) Shrubs 60-100 cm tall; bark of twigs exfoliating in white strips; leaves 1-3 cm long, linear oblanceolate, spatulate or obovate, scurfy when young, glabrate in age; flowers inconspicuous; fruiting bracts 5-12 mm long, usually over 5 mm wide, glabrous, greenish, often reddish in age. Common in a few areas of coarse-sandy soils, especially in and west of the Red Hills. May through June. The leaves and fruit are usually deciduous by July. This is palatable to sheep after spring growth starts, but in most years the sheep have left before growth starts.

***Halogeton* C. A.
Mey. Halogeton**

Halogeton glomeratus (Bieb.) Mey. in Ledeb. Annual herb, succulent, 3-30 cm tall, with branched stems, glabrous except tomentose in leaf axils; leaves 5-10 mm long, about 1-3 mm wide, alternate, terete or nearly so, entire, with a single hairlike bristle at the apex; flowers inconspicuous, unisexual or bisexual, in axillary clusters; perianth segments 5; stamens 3 or 5; stigmas 2; fruit encompassed by a scarious, horizontal, 3-4 mm wide wing. Introduced from Eurasia, adventive on disturbed ground, most common along roadways, flooded outwash areas in valley bottoms, areas of rodent disturbance, and where perennial plant cover has been reduced by abusive grazing; abundant and productive on these areas in years of greater than normal summer moisture. Poisonous to sheep, but sheep losses from halogeton have not been documented from the DER.

***Kochia* Roth.**

- 1 Plants annual herbs, sparingly introduced *K. scoparia* (L.) Schrad.
- 1 Plants perennial, more or less woody at the base
 - 2 Plants branched in the inflorescence, 10-75 cm tall, introduced (a single plant seen at the gaspump at Headquarters in 1983); stems often reddish in age *K. prostrata* (L.) Schrad.
 - 2 Plants not branched in the inflorescence, 10-30 cm tall, native; stems seldom reddish *K. americana*

Kochia americana Wats. Gray molly, green molly. Perennial subshrubs, dying back to lower woody part of crown in winter, sericeous to glabrate; leaves alternate, 5-25 mm long, about 1 mm wide, terete; flowers inconspicuous, bisexual or some pistillate, solitary or few in axils of leaves; perianth 5-lobed, persistent; stamens 3-5; stigmas 2-3; fruit encompassed by a horizontal wing. Occasional to dominant on and around Pine Valley Hardpan and valleys, infrequent in small patches on lower hills and fans. Moderately palatable to sheep and cattle in winter (when the herbage is dark brown to black). The glabrate phase is referable to var. *americana*. The pubescent phase is referable to var. *vestita* Wats. (*K. vestita* Rydb.).

***Monolepis* Schrad.
Monolepis; Poverty
Weed**

Monolepis nuttalliana (Schult.) Greene Annual herbs, stems few to several from the base, ascending, succulent, mealy when young, 5-20 cm long; leaves 1-4 cm long, usually hastately lobed at the base; flowers in dense axillary clusters and in terminal interrupted spikes, the clusters often reddish in age; perianth inconspicuous; seeds dark. Rare or occasional in some years on volcanic soils of the Red Hills. May through July.

Salsola L.
Russian Thistle;
Tumbleweed

Annual herbs, succulent to spiny tumbleweeds; leaves linear to terete; flowers inconspicuous, borne in axils of subulate spine-tipped bracts along open terminal spikes, bisexual; fruit encompassed by a horizontal wing (calyx wings).

1 Plants (from seedling to time of flowering) neither rigid nor prickly, appearing taller than wide, narrowed toward the apex with the central stem longer than the slender, ascending lateral branches, soft to the touch until late summer, blue-green in color; stems often with longitudinal red-purple lines; young leaves less than 1 mm wide, subterete, weakly spine-tipped, 1-3 cm long, becoming more rigid at maturity, and replaced in the inflorescence by short, pungent, rigid, broad bracts; flowers appearing in August to early September, 2-3 weeks later than in the following; fruiting calyx-wings small, mostly less than 2 mm long, sometimes deep red *S. iberica*

1 Plants rigid and prickly to the touch from seedling through maturity, appearing as wide as tall and convex topped with the stout, strongly spreading to decumbent lateral branches as long as the central stem, yellow-green in color; stems without purple lines or the lines pale; leaves from seedling stage through maturity, thick, terete, rigid, recurved toward the apex, strongly pungent-tipped, 0.5-1.5 cm long, 1-1.5 mm wide; flowers appearing in July and August; fruiting calyx-wings large, 3-4 mm long, colorless to pale pink, with conspicuous veins *S. paulsenii*

Salsola iberica Sennen & Pau Russian thistle, tumbleweed. (*S. pestifer* A. Nels.; *S. kali* L. misapplied). Introduced from Russia, weedy along roads and other disturbed areas. July through September.

Salsola paulsenii Litv. Barbwire Russian thistle. Introduced from Russia and central Asia, weed along roads and in other disturbed areas. July through August.

Sarcobatus Nees.
Greasewood

Sarcobatus vermiculatus (Hook.) Torr. Greasewood, black greasewood. Spiny much branched shrubs with rigid stems, 0.3-1.5 m tall, rarely taller on DER; twigs of the season green and succulent at first, turning white and spiny before the start of the second season; leaves 1-4 cm long, 1-3 mm wide, linear, entire, slightly flattened to nearly terete, glabrous, green, fleshy-succulent; flowers inconspicuous, unisexual, the staminate in conelike or catkinlike spikes, these 5-25 mm long, the pistillate 1-2 in axils of leaves; fruit encompassed by a horizontal, scarious, 6-12 mm long wing. Common at Pine Valley Hardpan, rare in hills. May through August.

CUPRESSACEAE; CYPRESS FAMILY

Juniperus L.
Juniper

Juniperus osteosperma (Torr.) Little Utah juniper, boneseed juniper, white cedar. (*J. utahensis* [Engelm.] Lemmon) Shrubs to small trees, with shredding fibrous bark; leaves evergreen, scalelike, mostly not over 3 mm long, strongly overlapping and appressed to the twigs, appearing as a scaly covering on the twigs, aromatic, opposite; pollen-bearing cones 3-4.5 mm long, yellowish-brown, with 13-24 microsporophylls (much reduced and modified leaf that bears a spore that gives rise to a male gametophyte); seed-bearing cones berrylike, globose or ovoid, bluish, bluish-white, to reddish-brown, glaucous, with 1 (2) seeds. Dominant or codominant with singleleaf pinyon on Tunnel Springs Mountain, rare in other hills. Apparently sensitive to cold temperatures of long duration and not found in valleys or lower hills where cold air drainage is common in winter. Used occasionally by antelope.

CYPERACEAE; SEDGE FAMILY

Carex L. Sedge

Carex rossii F. Boott Ross sedge. Plants perennial, grasslike, 3-10 cm tall, rarely taller at DER, reddish or purplish at the base, caespitose; leaves basal and on lower part of stems, linear, 1-4 mm wide; flowers inconspicuous, borne in unisexual spikes, the staminate ones consisting of 3 stamens subtended by a scale, the pistillate ones consisting of an ovary enclosed in a pubescent sac (perigynia). Occasional, Tunnel Springs Mountain in pinyon-juniper communities. May through June. (An unidentified *Carex* grows at Headquarters by a leaky tap.)

EPHEDRACEAE; EPHEDRA FAMILY

Ephedra L.
Ephedra; Mormon
Tea; Jointfir

Shrubs with yellowish, bluish, or greenish opposite or whorled twigs; leaves reduced to readily deciduous opposite scales, and thus usually lacking; stamens and seeds borne in unisexual cones.

- 1 Branches divergent; glaucous, blue-green or gray-green; base of mature leaves light brown to gray, deciduous *E. nevadensis*
- 1 Branches erect or strongly ascending, broomlike, yellowish-green to green becoming brownish in winter; base of mature leaves dark brown, persistent *E. viridis*

Ephedra nevadensis Wats. Nevada ephedra. Common in hills, higher parts of fans, and benchlands (where sometimes dominant) at the valley edges. Twigs remain green for several years. The current year's growth is remarkably slow to lignify and remains succulent later than is usual for most woody plants, but new growth is lacking in some years and in other years only some plants or parts of plants produce new growth. Young twigs are used by sheep in winter. Antelope use the plant year round and especially when twigs are succulent.

Ephedra viridis Cov. Green ephedra. Scattered in the hills and stony places, not found on valley alluvium at the DER. Not known to be used by antelope or by sheep.

EUPHORBIACEAE; SPURGE FAMILY

Euphorbia L.
Spurge; Euphorbia

Low to prostrate forbs with milky juice; leaves opposite, 3-15 mm long, more or less oblique at the base; pistillate and staminate flowers borne together in cuplike structures (involucres), the pistillate flowers solitary and central, the staminate flowers 1-several, borne at the edge of the involucre and consisting of a single stamen, pistillate and staminate flowers and involucres collectively referred to as a cyathium, the cyathium appearing as a single flower; edge of the involucre often with glands and with or without petallike appendages; fruit a 3-celled, pedicelled, usually nodding capsule.

- 1 Plants perennial, from little to much branched caudices; leaves entire, some broadly ovate to orbicular *E. fendleri*
- 1 Plants annual, from simple, slender taproots; leaves minutely serrate at the apex, obovate-oblong to ovate-oblong *E. serpyllifolia*

Euphorbia fendleri T. & G. Fendler spurge. (*Chamaesyce fendleri* [T. & G.] Small) Occasional, mostly in hills and washes. June through September. Sought out by antelope.

Euphorbia serpyllifolia Pers. Thymeleaf spurge or euphorbia. (*Chamaesyce serpyllifolia* [Pers.] Small) Occasional at least in some years, driveways, washes, and elsewhere. July through September. Sought out by antelope.

FABACEAE (LEGUMINOSAE); PEA FAMILY

Herbs (species native to DER); leaves alternate, pinnately or palmately compound, stipulate; flowers bisexual, irregular, usually in racemes or heads; calyx 5-lobed; corolla papilionaceous (sweetpea type) with 5 petals, but these appearing as 4, the uppermost one (banner) the longest, the 2 lateral ones (wings) turned about 90° to the banner, the lower 2 (keel) fused and appearing as a single boat-shaped or keel-shaped petal, this parallel to and folded between the wings; stamens 10, the filaments all united into a tube that surrounds the pistil (monodelphous), or 9 united and 1 free (diadelphous); ovary superior; fruit (pod) a legume.

- 1 Leaves pinnately compound
 - 2 Leaves odd pinnate, the rachis with a terminal leaflet; styles not bearded *Astragalus*
 - 2 Leaves even pinnate, the rachis of at least some ending in a tendril and not a leaflet; styles bearded down one side as in a toothbrush *Lathyrus*
- 1 Leaves trifoliolate or palmately compound
 - 3 Plants 30-80 cm tall or taller, annual or biennial; leaves 3-foliolate; leaflets serrate-dentate on the upper half; racemes few to several, not all terminal; flowers 4-6 mm long, not bluish *Melilotus*
 - 3 Plants 3-10 (20) cm tall, perennial, or if annual then some leaves with more than 3 leaflets and leaflets entire; racemes or heads solitary and terminal; petals sometimes bluish

- 4 Plants annual, caulescent, greenish with scattered hairs, the hairs of the stems and petioles strongly spreading; stamens diadelphous *Lupinus*
- 4 Plants perennial, acaulescent, whitish to grayish with dense appressed hairs; stamens monadelphous
- 5 Flowers borne in heads; plants pulvinate caespitose, growing on rock outcrops; pods about 5 mm long *Trifolium*
- 5 Flowers borne in racemes, these sometimes headlike; plants caespitose or not, not restricted to rock outcrops; pods 8-25 mm long *Astragalus calycosus*

***Astragalus* L.
Milkvetch; Vetch**

Perennial herbs, mostly with odd-pinnate compound leaves; flowers in racemes, white, pink, or purplish; stamens diadelphous, ovary enclosed in the staminal sheath. Most species are short-lived at DER. *Astragalus calycosus* and *A. newberryi* are seen every year, but the others are rare most years and never really abundant in the years when they are common.

- 1 Leaves strictly basal, with 3-5 (7) leaflets; flowers 10-16.5 mm long, the wing petals notched at the apex; plants seldom over 10 cm tall; pods curved, 8-25 mm long, 3-4.5 mm thick, strigose *A. calycosus*
- 1 Leaves not strictly basal or some usually with more than 5 leaflets or flowers 18-32 mm long; plants various; pods various but either over 4.5 mm thick or densely woolly pubescent
 - 2 Plants green glabrous or with scattered hairs, with well-developed leafy stems, stipules shorter than and not concealing the internodes; pods glabrous or nearly so; flowers 10-21 mm long
 - 3 Pods bladderly-inflated, the walls thin and papery; racemes mostly equaling or exceeding the leaves; stems commonly over 3 mm thick; plants rather infrequent *A. lentiginosus*
 - 3 Pods not bladderly-inflated, the walls rather thick and leathery; racemes exceeded by the leaves; stems commonly less than 3 mm thick; plants rather common around the base of Tunnel Springs Mountain *A. beckwithii*
- 2 Plants white or gray with dense villose, or tomentose hairs, acaulescent or subacaulescent, leafy stems if present usually with stipules longer than and concealing the internodes; pods covered with dense woolly hairs; flowers 18-32 mm long
 - 4 Racemes 7-20 flowered, the axis 1.5-18 cm long in fruit; flowers 18-25 mm long; pods bilocular, descending; leaves with 15-35 leaflets, with straight and spirally twisted hairs; plants 6-30 cm tall *A. mollissimus*
 - 4 Racemes 2-8 flowered, the axis 0.4-2.7 cm long in fruit; flowers 20-32 mm long; pods unilocular, ascending to spreading; leaflets 3-15 (19), with various pubescence; plants 2-14 cm tall
 - 5 Plants strictly acaulescent, mostly with persistent leaf bases and stipules clothing the base of stems and caudex; leaflets 3-15, gray-green with a bluish cast; calyx 11.5-20 mm long; pods 18-23 mm long, 7-12 mm thick, villous-tomentose; plants rather common *A. newberryi*
 - 5 Plants subacaulescent, lacking persistent leaf bases and stipules; leaflets 9-19, gray-green without bluish cast; calyx 12-14 mm long; pods 17-30 mm long, 5.5-7.5 mm thick, shaggy-villose; plants rather rare *A. utahensis*

Astragalus beckwithii T. & G. var. *purpureus* Jones Beckwith milkvetch. Locally common on Tunnel Springs Mountain. (April) May through June.

Astragalus calycosus Torr. in Wats. var. *calycosus* Torrey milkvetch. Occasional, mostly in hills and upper parts of fans. May through June.

Astragalus lentiginosus Dougl. var. *araneosus* (Sheld.) Barneby Specklepod locoweed. (*A. araneosus* Sheld.) Apparently short-lived and common in some years (but not abundant), but rare or absent in other years, on sandy to loamy areas toward the bottom of Pine Valley. May through June.

Astragalus mollissimus Torr. var. *thompsonae* (Wats.) Barneby Woolly milkvetch. (*A. bigelovii* Gray) Infrequent or occasional on old fans especially south and east of Tunnel Springs Mountain. May through June.

Astragalus newberryi Gray Newberry milkvetch. Occasional, mostly in hills and upper parts of fans. Late April through June.

Astragalus utahensis (Torr.) T. & G. Utah locoweed, Utah milkvetch. Apparently rare, the two records seen are from Halfway Hills and Warm Cove Ridge. May through June.

Lathyrus L.
Peavine

Lathyrus brachycalyx Rydb. Perennial villous herbs, 5-20 cm tall; leaves odd pinnate, the rachis ending in a tendril; leaflets 6-12, 10-25 mm long, 2-10 mm wide, linear to oblanceolate; racemes with 2-5, pink to pink-purple flowers 15-25 mm long; pods 3-7 cm long, 5-10 mm wide. A few plants seen in a small canyon on the east side of Warm Cove Ridge. May through June.

Lupinus L.
Lupine

Lupinus pusillus Pursh var. *intermontanus* (Heller) C. P. Smith Annual herbs, 3-15 cm tall, with sessile cotyledons, with spreading long hairs; leaves mostly cauline; leaflets 3-9, 11-48 mm long, 2-10 mm wide, oblanceolate, flat or folded; racemes 4-several flowered; flowers 8.5-12 mm long, the petals blue or rarely pink or white. Infrequent or occasional in some years on sandy soil at the east edge of the DER in Pine Valley. May through June.

Melilotus L.
Sweetclover

Plants annual or biennial, usually 30-100 cm tall or taller, caulescent; leaves trifoliate, the leaflets serrate-dentate on the upper half; flowers 4-6 mm long, 38-115 per raceme; pods 2.5-6 mm long.

- 1 Petals white *M. alba*
- 1 Petals yellow *M. officinalis*

Melilotus alba Medicus White sweetclover. Introduced from Europe, occasional along Highway 21 in Halfway Hills, to be expected elsewhere along roads. May through June, or September with rains.

Melilotus officinalis (L.) Pallus Yellow sweetclover. Introduced from Europe, the one specimen seen is from near DER Headquarters, to be expected elsewhere along roads. May through June or September with rains.

Trifolium L.
Clover

Trifolium andersonii A. Gray var. *friscanum* Welsh Dolomite clover. Perennial, pulvinate caespitose, mat-forming acaulescent herbs, 1-3 cm tall; leaflets 3-5 per leaf, 5-11 mm long, 2-5 mm wide, subvillous, pointed at tip; heads with about 3-5 flowers; calyx villous, banner about 6-9 mm long; pods about 5 mm long, villous. Locally common at a few places on Tunnel Springs Mountains, cracks of dolomite outcrops. The var. *friscanum* is a narrow endemic known only from the San Francisco Mountains and Tunnel Springs Mountain.

GENTIANACEAE; GENTIAN FAMILY

Swertia L.
Swertia; Green
Gentian

Swertia albomarginata (Wats.) Kuntze Whitemargined frasera, green gentian. (*Frasera albomarginata* Wats.) Perennial branched herbs, 20-40 cm tall, glabrous; leaves basal and cauline in whorls of 3-4, 2-8 cm long, lance-linear; flowers in open panicles; corolla greenish-white with dark dots, 8-10 mm long, bearing a linear gland, the gland with a fringe of hairs at the margin; fruit a capsule. Occasional in pinyon-juniper and mahogany communities on Tunnel Springs Mountain and Halfway Hills. May through June.

GERANIACEAE; GERANIUM FAMILY

Erodium L'Her.
Storksbill; Filaree

Erodium cicutarium (L.) L'Her. Alfileria. Annual herbs, 3-10 cm tall, strigose and glandular-pubescent; leaves mostly 2-7 (10) cm long, pinnately compound, cut into fine segments; petals 5-7 mm long, rose-lavender; fruit a schizocarp, with a styler column 1-5 cm long, the 5 mericarps separating at maturity, their elongate styles twisting in a corkscrew fashion, responding to changes in humidity. Introduced from the Mediterranean region, infrequent but in some years common on sheep bedgrounds that have been abandoned for several years. March through May and perhaps again from September through October with late summer or fall rains.

HYDROPHYLLACEAE; WATERLEAF FAMILY

Phacelia Juss.
Scorpionweed

Forbs pubescent and sometimes glandular; leaves alternate, toothed to pinnately lobed, basal and cauline; flowers often in coiled, secund cymes that unfold and straighten as the flowers mature; corolla united at least at base, tubular to rotate; style shortly to deeply bifid.

- 1 Plants (5) 10-40 cm tall, winter annual, common in some years especially in valleys and on fans; corollas 6-10 mm long, deep violet or blue-purple, with a white throat, or all white in albino forms; stamens and style exserted *P. crenulata*
- 1 Plants 2-5 (10) cm tall, annual, rather rare in hills on DER; corollas 2-4.5 mm long, white to pale lavender, the tube yellowish; stamens and styles included
- 2 Leaves entire or shallowly toothed, elliptic to ovate; filaments and style hairy at the base *P. incana*
- 2 Leaves pinnately lobed, oblong to linear in outline; stamens and style glabrous *P. ivesiana*

Phacelia crenulata Torr. in Wats. var. *corrugata* (A. Nels.) Brand. (*P. corrugata* A. Nels.) Infrequent or occasional, and in some moist years abundant, and one of the few forbs to give flower color to the desert aspect, but in some years lacking; mostly in valleys but also in hills. May through June.

Phacelia incana Brand. Infrequent or locally common in some years, hills. April through June.

Phacelia ivesiana Torr. in Ives. The only specimen seen is from Tunnel Springs Mountain, from duff of a pinyon tree. May through June.

LAMIACEAE (LABIATAE); MINT FAMILY

Perennial herbs or shrubs; leaves opposite; flowers in axillary or terminal clusters; corollas united, more or less irregular and 2-lipped; ovary superior, 4-lobed, with one 2-cleft style; fruit of four 1-seeded nutlets.

- 1 Plants woody at least toward the base; flowers blue, borne in 1-4 headlike glomerals *Salvia*
- 1 Plants herbaceous; flowers not blue, axillary or spicate
- 2 Plants puberulent, strongly aromatic; leaves 5-15 mm long, 1-3 (5) mm wide, linear to narrowly elliptic, entire, sessile; stamens 2 *Hedeoma*
- 2 Plants (at least stems and sometimes leaves) white-woolly, not strongly aromatic; leaves 15-40 mm long or longer, about as wide, ovate to suborbicular, crenate, petioled; stamens 4 *Marrubium*

Hedeoma Pers.
Pennyroyal

Hedeoma drummondii Benth. Drummonds pennyroyal. Perennial, aromatic herbs, 10-25 cm tall, with several branched stems; corollas about 1 cm long. The few specimens seen are from the east side of Warm Cove Ridge. May through June.

Marrubium L.
Horehound

Marrubium vulgare L. Common horehound. Perennial or perhaps biennial nonaromatic herbs, 20-50 cm tall with 1-several stems; herbage usually gray or white with woolly hairs except on the upper leaf surfaces; corolla 5-6 mm long, whitish. Introduced from Europe, somewhat weedy but rare, mostly along roadsides and around Headquarters.

Salvia L. Sage

Salvia dorrii (Kell.) Abrams var. *argentea* (Rydb.) Cronq. Grayball sage. (*S. carnosa* Dougl.) Shrubs 20-50 cm tall; stems densely scurfy-pubescent, punctate-glandular, strong aromatic; leaves 7-15 mm long, round obovate to spatulate; glomerules of flowers subtended by purplish or greenish rounded bracts; corollas 10-12 mm long, 2-lipped. Infrequent in hills and along washes. May through June.

LILIACEAE; LILY FAMILY

Perennial herbs from bulbs; leaves simple, entire, linear, with parallel veins, usually strongly sheathing; flowers regular or nearly so, bisexual; perianth of 6 tepals (the sepals and petals often alike and referred to collectively as tepals); stamens 6; ovary superior; styles 3 or stigmas 3-lobed; fruit a capsule.

- 1 Inflorescence an umbel with 5-many rays; tepals about 7-12 mm long, white to pinkish; plants with strong onionlike odor, 3-10 cm tall; leaves 1-2 (3) *Allium*
- 1 Inflorescence not an umbel; tepals various; plants not with onionlike odor; leaves various
- 2 Flowers 10 or more in a raceme or panicle; tepals 3-6 mm long, white to cream; leaves mostly basal or basally disposed *Zigadenus*
- 2 Flowers mostly 1-4; tepals 10-35 mm long, variously colored; leaves not basal or basally disposed

- 3 Petals white, tinged with pink, 2-3.5 cm long, strongly contrasting with the smaller, greenish sepals; leaves crowded, not much overlapping; capsules lanceolate, 2.5-3.5 cm long *Calochortus*
- 3 Tepals greenish-brown to chocolate-brown and spotted, all about equal and not strongly differentiated into petals and sepals; leaves sometimes crowded and strongly overlapping; capsules broadly obovoid, 1-1.5 cm long *Fritillaria*

Allium L. Onion

With features of the family and as listed in the key.

- 1 Leaves 1, terete, often coiled at the tip; stems terete; umbels with few to many flowers; pedicels up to twice as long as the tepals *A. nevadense*
- 1 Leaves 2, flattened, often curved; stems somewhat flattened, slightly winged; umbels 5-15 flowers; pedicels only about as long as the tepals *A. parvum*

Allium nevadense Wats. Nevada onion. The two specimens seen are from Halfway Summit. May through June.

Allium parvum Kellogg Small onion. The two specimens seen are from Tunnel Springs Mountain.

**Calochortus Pursh
Sego Lily; Mariposa
Lily**

Calochortus flexuosus Wats. Weakstem or flexstem sego lily. Perennial herbs, more or less decumbent or twining among bushes or straggling along the ground; stems 15-30 (40) cm long; leaves scattered; flowers 1-4, showy. Infrequent in hills. May through June.

**Fritillaria L.
Fritillary**

Fritillaria atropurpurea Nutt. Perennial herbs, with erect stems, 10-40 cm tall; leaves rather crowded to scattered on the upper half of the stem; flowers 1 (2-4), nodding; capsules erect, slightly winged. The one specimen seen is from the northern boundary of the DER on Tunnel Springs Mountain.

**Zigadenus Michx.
Deathcamas**

Zigadenus paniculatus Wats. Foothill deathcamas. Perennial herbs from bulbs covered with dark blackish scales, 20-40 cm tall; leaves 10-20 cm long, 3-15 mm wide, basal or on the lower fourth of the stem, upper leaves reduced and bractlike; inflorescence showy but petals small; fruit a 10-18 mm long capsule. Rare, upper parts of fans and hills. May through June.

LINACEAE; FLAX FAMILY

Linum L. Flax

Perennial herbs, glabrous or nearly so, glaucous; leaves simple, alternate, entire, linear or nearly so, sessile, 1-3 cm long, 1-4 mm wide; flowers more or less showy; sepals and petals 5, separate, the sepals persistent, the petals opening in morning, deciduous within a few hours (usually by noon); fruit a 10-chambered capsule, each chamber 1-seeded.

- 1 Petals blue; stigmas elongate or at least longer than wide *L. perenne*
- 1 Petals yellow; stigmas capitate *L. subteres*

Linum perenne L. var. *lewisii* (Pursh) Eaton & Wright Blue flax. Occasional on upper parts of fans and in hills. May through June. Used by antelope.

Linum subteres (Trel.) Winkler in Engler & Prantl. Yellow flax. (*L. aristatum* Engelm. in Wisliz. var. *subteres* Trel.) The one specimen seen (Hart sn BRY) is from fans or benchlands west of Tunnel Springs Mountain.

LOASACEAE; LOASA FAMILY

**Mentzelia L.
Blazingstar;
Mentzelia; Stickleaf**

Annual, biennial, or short-lived perennial plants; stems often glossy white, the epidermis exfoliating; leaves alternate, simple, covered with minute many-barbed hairs; flower terminal or axillary, small to showy; stamens 10-many; fruit a capsule.

- 1 Petals 2-6 mm long, 5, not apparently 10, the filaments of stamens all filiform; capsules about 2-3 mm thick, 5-30 mm long; plants winter annual, with slender (2-4 mm thick) stems *M. albicaulis*
- 1 Petals 25-80 mm long, 5, and apparently 10 with 5 of the outer filaments expanded and petaloid; capsules 15-35 mm long, about 1 cm thick; plants biennial, robust, 30-100 cm tall, with thick (10-15 mm or more) stems; leaves to 15 cm long *M. laevicaulis*

Mentzelia albicaulis Dougl. in Hook. Common winter annual in most years, mostly in sandy areas of rodent disturbance in valleys and in swales near washes. April through June.

Mentzelia laevicaulis (Dougl.) T. & G. Blazingstar. Occasional at least in some years, along Highway 21 through Halfway Hills. June through July or perhaps to September with summer rains.

MALVACEAE; MALLOW FAMILY

Sphaeralcea St. Hil. Globemallow

Perennial herbs, with sparse to dense stellate pubescence; leaves toothed to palmately lobed to dissected; petals 5, orange; stamens numerous, united by their filaments; fruit a schizocarp with 8-20 carpels, the carpels separating at maturity.

1 Leaf blades irregularly crenate-dentate to slightly 3-5 lobed; plants seldom more than 15 cm tall, white to gray with dense pubescence, long-lived perennial.

S. caespitosa

1 Leaf blades 3-5 lobed to divided, the main divisions usually cleft, parted or toothed; plants (10) 15-50 cm tall, gray-green with dense pubescence or thinly pubescent and greenish, short-lived perennial (probably not more than 5 years)

S. grossulariifolia

Sphaeralcea caespitosa Jones Tufted globemallow. Common, but not abundant, on shallow stony-gravelly soils in hills and upper parts of old fans. May through June.

Sphaeralcea grossulariifolia (H. & A.) Rydb. Gooseberryleaf globemallow. Common but scattered in many plant communities of valley bottoms where it is the most widespread perennial forb and in many places the only one. Regularly May through June and (with sufficient precipitation) any time until autumn frost. Stems remain green into early winter in some years and are then used by sheep; resumes growth in early spring and in some years grazed by sheep before they leave the winter range. Used by antelope during the growing period.

NYCTAGINACEAE; FOUR-O'CLOCK FAMILY

Perennial herbs (on DER), glabrous, puberulent, short-villose or glandular, often glaucous; leaves simple, opposite or all basal, entire, the blades elliptic, ovate to deltoid; flowers regular, bisexual, subtended by an involucre of free or united calyxlike bracts; perianth of a single whorl, corollalike, united, 3-5 lobed; fruit an achene, usually angled or ribbed.

1 Flowers many (more than 5) in terminal or axillary heads; perianth white or pinkish, the limb 2-8 mm wide, the tube narrow (salverform), 15-20 mm long; stamens included; involucre bracts free, scarious; petioles 10-50 mm long

Abronia

1 Flowers solitary or to 5 in clusters; perianth purplish-red, the limb 8-30 mm wide, the tube broader (campanulate to funnelform), 8-20 mm long; stamens usually more or less exserted; involucre bracts not scarious; petioles various

2 Stems and sometimes leaves puberulent to short-pilose and sometimes glandular; involucre united, glandular; perianth 8-12 mm long; petioles 5-20 mm long

Oxybaphus

2 Plants glabrous or obscurely puberulent upward; involucre bracts free, glabrous; perianth 20-25 mm long; petioles 1-10 mm long

Hermidium

Abronia Juss. Sandverbena

With features of the family and as listed in the key.

1 Leaves opposite, borne well upward on the stems; plants not at all caespitose

A. elliptica

1 Leaves basal or nearly so; plants somewhat caespitose

A. nana

Abronia elliptica A. Nels. Pink sandverbena. Occasional on sandy soil in Pine Valley near the east boundary of DER. May through June.

Abronia nana Wats. Dwarf sandverbena. Occasional, mostly on upper fans and hills. April through June.

Hermidium Wats.

Hermidium alipes Wats. (*Mirabilis alipes* [Wats.] Pilz.) Perennial herbs, 15-30 cm tall; leaf blades 2-7 cm long, ovate or nearly so; perianth 2-2.5 cm long; stamens 5-7. Occasional, valleys, fans, and lower hills. May through June. Used by antelope when green, dries up by midsummer, the stems becoming detached at or just below ground level, and blowing away with the leaves still attached.

Oxybaphus L'Her.
ex Willd.
Umbrellawort

Oxybaphus pumilus Standl. (*Allionia pumila* Standl.) Infrequent in gravelly wash bottoms and dry hills. May through June.

ONAGRACEAE; EVENING PRIMROSE FAMILY

Annual or perennial herbs (on DER); leaves alternate or basal, simple to pinnatifid; flowers bisexual, regular; sepals and petals 4, arising with 8 stamens from a floral tube; fruit a capsule.

- 1 Plants annual; petals 4-9 mm long; floral tube 4-8 mm long; capsules various *Camissonia*
- 1 Plants perennial; petals 13-50 mm long; floral tube 2.5-5 cm long or longer; capsules sessile or nearly so
 - 2 Leaves alternate on short stems and sometimes appearing basal, 5-15 mm long, 2-4 mm wide, entire; petals yellow, reddish-brown or orange in age; stigmas capitate *Calylophus*
 - 2 Leaves basal, or if cauline then not entire and over 15 mm long; petals white or pink; stigmas divided into 4 linear lobes *Oenothera*

Calylophus Spach.

Calylophus lavandulaefolius (T. & G.) Raven Lavenderleaf evening primrose. (*Oenothera lavandulaefolia* T. & G.; *Galpinsia lavandulaefolia* [T. & G.] Small) Plants small, suffrutescent, caespitose, grayish strigose; flowers solitary in upper axils; petals 13-22 mm long. Occasional in hills, shallow soils over dolomite bedrock, and cracks of exposed bedrock. May through August.

Camissonia Link
Camissonia

Annual herbs (at DER); flowers usually opening near sunrise, sometimes in afternoon, withering in less than a day; petals yellow, whitish, or pinkish, drying reddish or purplish; stigmas capitate.

- 1 Capsules sessile or nearly so, more or less contorted; petals white to pink when fresh; stems leafy; leaves entire or inconspicuously dentate; hypanthium 4-7 mm long *C. boothii*
- 1 Capsules on 5-20 mm long, slender pedicels, straight; petals various; stems sparsely leafy to subscapose; leaves serrate to pinnate; hypanthium 0.5-4 mm long
 - 2 Petals white or cream to pinkish; stigmas exerted beyond the anthers at anthesis; capsules 1.5-2.3 mm thick; leaves mottled with brownish purple spots *C. claviformis*
 - 2 Petals yellow, same color as stamens; stigmas surrounded by anthers, not exerted at anthesis; capsules 1.2-1.8 mm thick *C. walkeri*

Camissonia boothii (Dougl.) Raven ssp. *alyssoides* (H. & A.) Raven Alyssum evening primrose. (*Oenothera alyssoides* H. & A.; *Sphaerostigma alyssoides* [H. & A.] Walp.) Occasional to locally common, hills, fans, and valleys, mostly in gravelly washes where abundant in some years. May through June and responding to adequate rainstorms through September.

Camissonia claviformis (Torr. & Frem.) Raven ssp. *integrior* (Raven) Raven Brown-eyed evening primrose. (*Oenothera clavaeformis* Torr. & Frem.; *Chylismia clavaeformis* [Torr.] Heller) Occasional in valleys (perhaps only Pine Valley). May through June. Plants from the DER have been confused with *Camissonia scapoidea* (T. & G.) Raven. Plants of *C. scapoidea* have yellow and mostly smaller petals and stigmas that are surrounded by the anthers, and they have mostly simple leaves.

Camissonia walkeri (A. Nels.) Raven ssp. *tortilis* (Jeps.) Raven (*Oenothera walkeri* [A. Nels.] Raven) One specimen (Welsh and others 13317a BRY) appears to belong to this taxon. The specimen is from Sevy dolomite on benchland between Pine Valley and the pass between Tunnel Springs Mountain and Warm Cove Ridge. May through June.

Oenothera Evening
Primrose

With features of the family and as listed in the key.

- 1 Leaves all from a basal tuft, entire or wavy-margined; petals 2.5-4 cm long; floral tube over 3 cm long; plants from a taproot *O. caespitosa*
- 1 Leaves borne on the stems, basal ones lacking or few, pinnatifid or at least cleft; petals about 1-2 cm long; floral tube 1.5-3 cm long; plants from rhizomes, sometimes forming patches *O. pallida*

Oenothera caespitosa Nutt. var. *crinita* (Rydb.) Munz Tufted evening primrose. (*Pachylophus crinitus* Rydb.) Occasional, widespread. Late April through June, or through September with precipitation. Grazed by antelope whenever green and growing.

Oenothera pallida Lindl. Pale evening primrose. (*Anogra pallida* [Lindl.] Britton) Occasional on sandy soil at east edge of DER in Pine Valley.

OROBANCHACEAE; BROOMRAPE FAMILY

Orobanche L.
Broomrape;
Cancer-root

Perennial herbs (on DER), parasitic on roots of sagebrush, galleta, and other plants, lacking chlorophyll, whitish, yellowish, to brown, often fleshy; herbage glandular-hairy; leaves alternate, bractlike; corollas united, 2-lipped, the lips lobed; stamens 4; fruit a capsule.

- 1 Flowers sessile or on pedicels to about 2 cm long, closely subtended by 2 bractlets *O. corymbosa*
- 1 Flowers on scapelike pedicels about as long as the stems, not closely subtended by 2 bractlets *O. fasciculata*

Orobanche corymbosa (Rydb.) Ferris Infrequent or perhaps occasional, widespread. June through July.

Orobanche fasciculata Nutt. Clustered broomrape. Infrequent but widespread. June through July.

PAPAVERACEAE; POPPY FAMILY

Argemone L.
Prickly Poppy

Argemone munita Dur. & Hilg. Prickly poppy, cowboy eggs. (*A. hispida* Gray misapplied) Annual, prickly, coarse herbs, 60-100 cm tall; leaves alternate, pinnately lobed; flowers 5-10 cm in diameter; petals white; stamens numerous, yellow; stigmas 3-7 lobed; fruit a capsule, 35-55 mm long. Occasional in some years, road shoulders, raw banks of washes, and other areas of disturbance. July through September with summer rain.

PINACEAE; PINE FAMILY

Pinus L. Pine

Pinus monophylla Torr. & Frem. in Frem. Singleleaf pinyon. Small trees to about 6 (10) m tall; leaves needlelike, stout, sharp-pointed, (2) 3-5 (6) cm long; seeds borne in cones, the cones 3.5-6 (8) cm long, the seeds 13-15 (17) mm long. Occasional to dominant or codominant with juniper on Tunnel Springs Mountain.

POACEAE (GRAMINEAE); GRASS FAMILY

Annual or perennial herbaceous plants; stems mostly terete, the internodes mostly hollow, the nodes swollen and prominent, mostly not hollow; leaves alternate, simple, parallel-veined, strongly sheathing, the blades linear or filiform; ventral surface of the collar (junction of sheath and blade) projected into a ligule, this a membranous scale or a fringe of hairs; flowers bisexual or unisexual, solitary or 2-many in a spikelet, spikelets consisting of a rachilla (axis), 2 glumes (empty scales that subtend or envelope 1 or more florets), and 1 or more florets; florets consisting of: (1) 2 scales (a lemma and a palea, the lemma usually enclosing the palea), (2) usually 3 stamens, (3) a caryopsis (seed) from a 1-ovuled pistil with 2 styles and plumose stigmas.

- 1 Plants not restricted to or near irrigated places at Headquarters
- 2 Ligule of a fringe of hairs; plants 3-20 (30) cm tall, sometimes more or less matted; inflorescence congested; awn of lemmas lacking or to 5 mm long
- 3 Inflorescence of 1-3 one-sided (comblike) spikes; stem leaves few (1-3), not closely subtending nor fascicled in the inflorescence *Bouteloua*
- 3 Inflorescence not of one-sided comblike spikes, sometimes closely subtended by or in a fascicle of leaves
- 4 Lemmas each with 9 plumose awns, the awns 2-4.5 mm long; inflorescence a grayish-green dense spikelike panicle, usually closely subtended or partly enveloped at the base by the upper leaf-sheath; stems erect *Enneapogon*
- 4 Lemmas awn tipped or with only 1-3 awns

- 5 Inflorescence closely subtended by or partly hidden by 2-several or a fascicle of leaves, these leaves usually exceeding the inflorescence; lemmas bifid or deeply lobed; plants 3-15 cm tall
- 6 Plants not stoloniferous, strongly perennial; inflorescence subtended by but not hidden among 1-3 leaves that are rather abruptly narrowed at the collar, the blades long-acuminate; some of the lemmas deeply 2-3 lobed, the lobes awned from the tip, some of the awns sparsely plumose *Blepharidachne*
- 6 Plants sometimes stoloniferous, annuals or short-lived perennials; inflorescence in a fascicle of leaves, sometimes partly hidden among the leaves; lemmas not deeply lobed, or if so awned from the back between the lobes, the awns not plumose
 - 7 Spikelets nearly concealed in the fascicle of leaves; glumes not extending beyond midlength of the lower 2 lemmas; lemmas sparsely pubescent toward the base; bifid and awn tipped at the apex; plants annual *Munroa*
 - 7 Spikelets more or less visible in the fascicle of leaves; glumes as long or longer than the lower 2 lemmas; lemmas densely pilose pubescent, lobed to the middle or lower, awned from the base of the lobe, the awn equally or scarcely exceeding the lobes. *Erioneuron pulchellum*
- 5 Inflorescence not closely subtended by nor enveloped in a fascicle of leaves
 - 8 Ligule ciliate-fringed and membranous below, apparently but not actually of a fringe of hairs; inflorescence a spike; spikelets with a tuft of long pilose hairs at the base, soon falling and leaving a bare zigzagged rachis; plants 15-45 cm tall, from robust scaly rhizomes . *Hilaria*
 - 8 Ligule of a fringe of hairs; inflorescence headlike or ramose; spikelets without tufts of hair at the base, although the backs of the lemmas densely hairy, at least the glumes persisting; plants tufted not rhizomatous, 5-15 cm tall. *Erioneuron pilosum*
- 2 Ligules membranous and not of a fringe of hairs or else plants mostly over 30 cm tall or awns of lemmas over 9 mm long
 - 9 Lemmas 3-awned, the awns 1-3 cm long or longer; ligules of a fringe of hairs. *Aristida*
 - 9 Lemmas awnless or awns solitary or less than 1 cm long; ligules membranous except in *Sporobolus*
 - 10 Ligules of a fringe of hairs; glumes 1-3 mm long, awnless; lemmas only slightly longer than the glumes, awnless; spikelets 1-flowered; inflorescence an open or contracted panicle, sometimes enclosed in the upper leaf-sheath *Sporobolus*
 - 10 Ligules membranous, not of hairs but sometimes with ciliate hairs near to and easily confused with the hairs of the collar; glumes over 3 mm long or lemmas awned or spikelets more than 1-flowered, or all three
 - 11 Inflorescence a spike; spikelets all sessile and more than 1-flowered except in *Hordeum*
 - 12 Glumes as well as the lemmas awned, the awn over 1 cm long; rachis breaking up (disarticulating) at maturity
 - 13 Spikelets 1 per node of the rachis; glumes constricted to an awn, not awnlike their entire length; plants rare, sterile hybrids of *Agropyron* and *Sitanion* *Agrositanion*
 - 13 Spikelets 2 or 3 per node of the rachis; glumes awnlike their entire length; plants common or restricted, not sterile
 - 14 Plants rare, known from around Pine Valley Playa; spikelets 3 per node of the rachis, the 2 lateral spikelets slightly pedicellate, empty, sometimes reduced to awns; central spikelet sessile, fertile, with 1 floret *Hordeum*
 - 14 Plants widespread, scattered to common in hills, fans, and valleys; spikelets 2 per node of the rachis, both alike, with 1-6 florets *Sitanion*
 - 12 Glumes not awned or the awns less than 6 mm long; lemmas awnless or awns less than 6 mm long except in *Agropyron spicatum*; rachis not breaking apart at maturity

- 15 Spikelets each with a tuft of pilose hairs (these 3-6 mm long) at the point of attachment to the rachis, soon falling (disarticulating below the glumes) and leaving a bare zigzagged rachis; ligule a ciliate-fringed membrane; plants with robust scaly rhizomes, common *Hilaria*
- 15 Spikelets without tufts of hairs at the base, at least the glumes persistent; ligules various; rhizomes lacking except in *Agropyron smithii* and then plants rare
- 16 Most of the nodes of the rachis with 2 or more spikelets; glumes narrow and more or less awnlike their entire length; lemmas awnless or awn tipped; plants without rhizomes *Elymus*
- 16 Spikelets 1 per node of the rachis, occasionally 2 at some of the lower nodes, and plants rhizomatous; glumes not awnlike their entire length or somewhat so in *Agropyron smithii*, but then plants rhizomatous; lemmas sometimes with awns over 1 cm long *Agropyron*
- 11 Inflorescence an open or contracted panicle, if contracted then the branches evident upon teasing the inflorescence apart; spikelets with 1-several florets
- 17 Spikelets with 1 floret, the lemma awned; plants perennial
- 18 Glumes shorter than the lemma; scabrous on the keel toward the tip; stems decumbent, branched at the base, appearing rhizomatous *Muhlenbergia*
- 18 Glumes longer than the lemmas, not scabrous on the keel; stems ascending to erect not decumbent, tufted, not branched, not appearing rhizomatous
- 19 Awns of lemmas 2-8 (10) mm long, rather quickly deciduous; glumes 3-8 mm long; inflorescence open, at least the lower branches widely spreading *Oryzopsis*
- 19 Awns of lemmas 13-100 mm long or longer; glumes 7-25 (35) mm long; inflorescence open or contracted *Stipa*
- 17, Spikelets with 3-several florets; lemmas awnless and plants perennial or lemmas awned and plants annual
- 20 Lemmas awnless; spikelets 3-8 (10) mm long; plants perennial *Poa*
- 20 Lemmas awned; spikelets various; plants annual
- 21 Awns of lemmas (7) 10-17 mm long; spikelets (12) 15-20 (24) mm long; leaf sheaths often densely pubescent *Bromus*
- 21 Awns of lemmas 1.5-5 mm long; spikelets 5-10 mm long *Festuca*
- 1 Plants restricted to Headquarters area
- 22 Ligule a fringe of hairs, less than 1 mm long; plants unisexual, from robust scaly rhizomes, in lawns and roadsides near lawns; spikelets several-flowered 10-25 mm long; lemmas awnless, (inland saltgrass) *Distichlis spicata* (L.) Greene var. *stricta* (Torr.) Scribn.
- 22 Ligule membranous, not a fringe of hairs, 0.5-8 mm long; plants bisexual, caespitose to rhizomatous; spikelets various; lemmas various
- 23 Inflorescence a spike; auricle (appendage that arises at either side of the ventral summit of the sheath and more or less clasp the stem) more or less developed; ligules 0.5-1 mm long; plants mostly not growing in lawns
- 24 Spikelets 1 per node of the rachis, or occasionally 2 at some of the lower nodes and then plants with long-creeping rhizomes, scattered or if dense then forming a flattened spike *Agropyron*
- 24 Spikelets 2 per node of the rachis, dense and forming a nearly cylindrical spike; plants not rhizomatous *Elymus*
- 23 Inflorescence a panicle; auricles mostly lacking or small; ligules various; plants mostly growing in lawns
- 25 Spikelets 3-6 mm long, lemmas awnless; leaf blades 1-4 mm wide, folded to strongly keeled, prowlike at the tip as in the bow of a boat *Poa*
- 25 Spikelets over 6 mm long or else lemmas awn tipped; leaf blades 4-10 mm wide, at least those of the stem flat

- 26 Spikelets 15-25 mm long; lemmas awnless not ciliate on margins or keel; ligules 0.5-1.5 mm long; leaves mostly all flat (smooth brome) *Bromus inermis* Leys.
- 26 Spikelets 5-8 mm long; lemmas awn tipped, stiff ciliate on the keel and margins; ligules 4-8 mm long; stem leaves flat, those of the innovations strongly folded (orchardgrass) *Dactylis glomerata* L.

***Agropyron* Gaertn.
Wheatgrass**

Perennial plants; auricles (clasping appendages at the collar) often well developed; inflorescence a spike; spikelets 1 per node, occasionally 2 at some of the lower nodes of the rachis, with 3-several florets.

- 1 Spikelets densely crowded, 3-4 times as long as the internodes of the rachis, widely spreading and not appressed to the rachis; glumes and lemmas awn-pointed; plants introduced, uncommon on the station, mostly along roads, not rhizomatous *A. cristatum*
- 1 Spikelets not densely crowded, mostly less than 2 times as long as the internodes of the rachis
- 2 Plants rhizomatous, uncommon, known only from around Headquarters; glumes narrow, tapered from near the base, nearly subulate awnlike; lemmas awn tipped, the awn not over 2 mm long *A. smithii*
- 2 Plants not rhizomatous, common in hills; glumes more or less elliptic, not awn-like; lemmas usually with awns 1-1.5 (2) cm long *A. spicatum*

Agropyron cristatum (L.) Gaertn. Crested wheatgrass. Introduced from Eurasia, rare, found at Headquarters area and along roadsides.

Agropyron smithii Rydb. Western wheatgrass. (*Elytrigia smithii* [Rydb.] Love; *Pascopyrum smithii* [Rydb.] Love) Known from a single patch at Headquarters where it was planted.

Agropyron spicatum (Pursh) Scribn. & Sm. Bluebunch wheatgrass. (*Elytrigia spicata* [Pursh] D. R. Dewey) Occasional to common, apparently confined to Tunnel Springs Mountain, mostly in the pinyon-juniper zone. May through June. The foliage sometimes greens up in the fall.

**X *Agrositanion*
Bowden**

X *Agrositanion saxicola* (Scribn. & Sm.) Bowden (*Agropyron saxicola* [Scribn. & Smith] Piper) Squirreltail wheatgrass. A hybrid involving *Agropyron spicatum* and *Sitanion hystrix*. The only record seen is from the bank of a wash at Bullgrass Knoll.

***Aristida* L.
Three-awn**

Aristida purpurea Nutt. Purple three-awn. (*A. fendleriana* Steud.; *A. longiseta* Steud.) Perennial plants, tufted, 15-30 cm tall, leaf blades mostly basal, curling, pilose on the collar; ligules less than 1 mm long; panicles 2-6 cm long, narrow; spikelets with 1 floret; first glume about 8 mm long, the second glume about twice as long, both awnless; lemmas 9-12 mm long, each with 3 awns, the awns 2-5 cm long, divergent. Infrequent but sometimes locally common in small isolated patches, valleys, and hills. May through September with precipitation. Seldom starts growth before May, not grazed in winter by cows, sheep, or horses. Plants native to the DER have awns 1-3 cm long and are referable to var. *glauca* (Nees) A. Holmgren & N. Holmgren. Plants with awns mostly 3-10 cm long are advancing from the east along Highway 21 in Pine Valley. The long-awned plants are referable to var. *longiseta* (Steud.) Vasey.

***Blepharidachne*
Hackel**

Blepharidachne kingii (Wats.) Hackel King desertgrass. Low tufted perennials, 3-8 cm tall; leaves crowded, 7-30 mm long, sharp-pointed; panicles compact, subcapitate, 1-2.5 cm long, usually subtended and exceeded by 1-2 spathe-like leaves; spikelets few, 4-flowered, but only the third one fertile, the fourth reduced to 3-awned rudiment; glumes about equal; lemmas 3-lobed or short awned, the short awns more or less plumose. Occasional, upper parts of fans and lower hills. May through June, or through September with precipitation.

***Bouteloua* Lag.
Grama Grass**

Annual or perennial plants; ligules of a fringe of hairs; spikelets borne in comblike spikes, in 2 rows on 2 sides of a 3-angled rachis, with 1 bisexual and 1-3 staminate or rudimentary florets above the fertile one.

1 Plants annual, from a few fibrous roots, usually but not always on disturbed ground; spikes 1-2.5 cm long *B. barbata*

1 Plants perennial, rhizomatous and more or less mat-forming, common in indigenous plant communities; spikes 1.7-4 cm long *B. gracilis*

Bouteloua barbata Lag. Sixweeks grama. Seen only in occasional years when sometimes locally common in a few places, mostly where the ground has been disturbed. July through September. Germinates and grows with summer rains.

Bouteloua gracilis (H. B. K.) Lag. ex Steud. Blue grama, curly grass. Abundant in gravelly-loamy swales on the higher parts of fans. Late June through September. Usually starts growth about late April or later, fails to flower in some dry years, flowers up to 4 times in other years depending on timing and amount of summer and early fall precipitation.

***Bromus* L.
Brome; Chess**

Bromus tectorum L. Cheatgrass. Annuals, mostly 3-25 cm tall on DER, pubescent with rather soft long hairs; ligules 1-3 mm long; leaf blades 2-4 (7) mm wide; panicle nodding, with few to many spikelets; spikelets with 3-6 florets, 12-20 mm long; first glume 5-7 mm long, second glume 8-11 mm long; lemmas 10-15 mm long, with awns 7-15 mm long. Introduced from Europe, widespread but mostly along roads and in other areas of disturbance and especially in years preceded by moister than average autumns, mostly in higher parts of valleys and lower hills, seldom seen in valley bottoms, not seen in every year.

***Elymus* L.
Wildrye**

Perennial plants with densely tufted stems (on DER); auricles usually present; inflorescence a terminal, mostly solitary spike; spikelets about 3-8 flowered; glumes narrow, mostly shorter than the lemmas; lemmas awnless or awn tipped.

1 Plants 80-150 cm tall, known from along Mountain Home Wash; leaf blades mostly flat and 4.5-15 mm wide; ligules (1) 2-7 mm long; spikelets (2) 3-6 per node of the rachis; glumes 7-15 mm long; spikes dense, 7-12 mm wide *E. cinereus*

1 Plants 30-80 cm tall; leaf blades flat or rolled, 1.5-5 mm wide; ligules 0.2-1 mm long; spikelets 1-2 per node; glumes 0.8-8 (10) mm long; spikes various
2 Plants introduced, rare, known from near Headquarters; spikelets mostly with 2-3 florets, mostly 2 per node of the rachis, 7-10 mm long; spikes dense, 4-10 mm wide, the rachis disarticulating in age *E. junceus*

2 Plants native, common on Tunnel Springs Mountain; spikelets with 3-5 (10) florets, 1 or 2 per node of the rachis, 8-18 mm long; spikes interrupted or dense, 2-5 (6) mm wide, the rachis not disarticulating *E. ambiguus*

Elymus ambiguus Vasey & Scribn. var. *salmonis* C. L. Hitchc. Bullgrass. (*Leymus salinae* [Jones] Love ssp. *salmonis* [C. L. Hitchc.] R. J. Atkins) Locally common on and near Tunnel Springs Mountain. May through June. Used lightly by sheep in most winters.

Elymus cinereus Scribn. & Merr. Great Basin wildrye, basin wildrye. (*Leymus cinereus* [Scribn. & Merr.] Love) Occasional along Mountain Home Wash from the west boundary of DER through the Red Hills.

Elymus junceus Fisch. Russian wildrye. (*Psathyrostachys juncea* [Fisch.] Nevski) Introduced from the U.S.S.R., used in rangeland seedings; the only DER specimen seen is from Headquarters.

***Enneapogon*
Desvaux ex Beauv.**

Enneapogon desvauxii Beauv. Spike pappusgrass. (*Pappophorum wrightii* Wats.) Tufted perennial or perhaps sometimes annual, 10-30 cm tall, pilose to villous on culms and leaves and especially on nodes; ligules 0.7-1 mm long; blades 3-12 cm long, 1.5-2 mm wide, loosely involute; panicles 2-7 cm long, dense and spikelike; spikelets 3-flowered, the lower floret fertile, the upper 2 sterile; glumes about 3-6 mm long; lemmas 1.5-2.5 mm long, 9 nerved, the nerves extending into plumose awns, the awns 2-4.5 mm long. The one specimen seen is from Warm Cove Ridge. August through September.

***Erioneuron* Nash**

Tufted (annuals?) perennials; leaves mostly in a basal tuft; spikelets in spikelike racemes of panicles with 4-several florets.

- 1 Plants more or less stoloniferous, short-lived perennial (annual?), spreading, the stems not erect; leaves basal and fasciated in the inflorescence; lemmas deeply lobed, short-awned from between the lobes *E. pulchellum*
- 1 Plants not stoloniferous, strongly perennial; the culms erect; leaves all or nearly all basal, inflorescence elevated well above the leaves; lemmas slightly retuse at the apex, short-awned from the apex *E. pilosum*

Erioneuron pilosum (Buckl.) Nash Hairy tridens. (*Tridens pilosus* [Buckl.] A. S. Hitchc.; *Triodia pilosa* [Buckl.] Merr.) Occasional, fans and hills. April through September, responding to sufficient precipitation throughout the growing season.

Erioneuron pulchellum (H. B. K.) Tateoka Fluffgrass. (*Tridens pulchellus* [H. B. K.] A. S. Hitchc.; *Triodia pulchella* H. B. K.) Not seen in some years, abundant in some past years on gentle slopes between Pine Valley and south face of Tunnel Springs Mountain; occasional elsewhere, mostly in hills and upper parts of fans. April through September, responding to sufficient precipitation throughout the growing season.

***Festuca* L.
Fescue**

Festuca octoflora Walt. Sixweeks fescue. (*Vulpia octoflora* [Walt.] Britt.) Annuals, 3-15 (20) cm tall; ligules 0.2-0.7 mm long; blades involute; panicles 1-5 cm long, racemose or spike-like; spikelets with 6-12 florets; glumes 2-6 mm long; lemmas 3-5 mm long, with 1.5-4 mm long awns. Infrequent or locally common, mostly on hills and upper parts of fans. May through June.

***Hilaria* H. B. K.
Galleta**

Hilaria jamesii (Torr.) Benth. Galleta, curly grass. Perennial plants from large scaly rhizomes, 15-30 (40) cm tall; stems with solid internodes, the nodes often pubescent; leaves mostly toward the base of stems, blade soon involute, basal leaves often recurved or curled when dry; collars usually pilose; ligules 2-3 mm long; spikelets borne in solitary, terminal spikes, on a zigzagged rachis, deciduous at maturity and leaving the rachis bare; glumes and lemmas with short awns. Dominant or codominant over much of the DER, especially on older gravelly alluvium and some sandy flats below the level of the Pleistocene lake, widespread through the hills. A useful forage species for cattle and sheep in winter. A warm-season grower, never green before the sheep leave the range in April, grows with sufficient moisture any time from May through September. The foliage dries and plants go into dormancy when the moisture is gone. The plants go through as many as 4 growth-dormancy cycles in some years.

***Hordeum* L.
Barley; Foxtail**

Hordeum jubatum L. Foxtail barley. Tufted perennials sometimes short-lived; ligules 0.5-1 mm long; blades flat to involute, 1.5-4 mm wide; auricles usually lacking; spikelets in dense spikes, 3 at each node of the rachis, each 1-flowered, the central spikelet sessile with a well-developed fertile floret, the 2 lateral spikelets short-pedicel with staminate or rudimentary florets; glumes awnlike their entire length, lemmas long-awned; awns of glumes and lemmas 1-10 cm long. The only specimens seen are from the edges of the Pine Valley Playa.

***Muhlenbergia*
Schreber Muhly**

Muhlenbergia arsenei A. S. Hitchc. Navajo muhly. Perennials with much branched solid stems, the stems erect or decumbent and appearing rhizomatous, wiry; leaves crowded toward the base of the stems; ligules about 1-2 mm long; blades filiform-involute, sharp pointed; spikelets in narrow panicles, with 1 floret; glumes 2-3 mm long; lemmas (3) 4-5 mm long, with a 5-12 mm long flexuous awn. Infrequent, rocky slopes of Warm Cove Ridge. August through September.

***Munroa* Torr.**

Munroa squarrosa (Nutt.) Torr. False buffalograss. Low sprawling annuals, 3-10 cm tall rarely taller; stems often stolonlike, leafless except with tufts of leaves toward the ends; the tufts of leaves subtending or partly concealing the inflorescence; leaf sheaths ciliate near the collar; ligules not over 1 mm long; blades rolled, 1-3 cm long, not over 3 mm wide; spikelets 2-4 in a usually partly concealed congested panicle, 6-8 mm long, with 3-5 florets; glumes 3-4 mm long; lemmas 3-5 mm long, 3-nerved, the midnerve prolonged into a 0.5-2 mm long awn. Occasional in years with summer rains, sometimes locally common on ground disturbed by rodents or along banks of washes. July through September.

***Oryzopsis* Michx.
Ricegrass**

Perennial bunchgrasses, leaves usually rolled; spikelets in panicles, with 1 floret; glumes equal or a little longer than the lemma; lemmas often plump, rather firm, the callus usually bearded, awned from the tip, the awn straight or bent, readily deciduous.

- 1 Plants common to abundant, widespread; panicles open, dichotomously branched; the primary and secondary branches often strongly divaricate; spikelets 6-8 mm long excluding the awn; lemmas with hairs about equal or longer than the body; ligules 3-8 mm long *O. hymenoides*
- 1 Plants rare on Tunnel Springs Mountain; panicles narrow or with spreading to deflexed primary branches, the secondary branches not much if at all divaricate; spikelets 2-4 mm long excluding the awn; lemmas glabrous; ligules 0.2-2 mm long *O. micrantha*

Oryzopsis hymenoides (R. & S.) Ricker in Piper Indian ricegrass. Common to abundant from valley bottoms to mountains in a number of plant communities, especially common on sandy soils. May through June. Grows mostly in spring and early summer with some greening up in early autumn in some years. Palatable forage plant for cattle, sheep, and horses at all seasons, and for antelope for a few weeks after growth starts in early spring.

Oryzopsis micrantha (Trin. & Rupr.) Thurb. Littleseed ricegrass. Rare, Tunnel Springs Mountain, pinyon-juniper communities on shady sides of rock outcrops.

**Poa L.
Bluegrass**

Perennial tufted or rhizomatous plants; blades usually folded and keeled; spikelets with (2) 3-10 florets; glumes shorter than the lemmas; lemmas awnless.

- 1 Plants strongly rhizomatous, introduced, principal plant in lawns and at other irrigated places at Headquarters; panicles open with conspicuous spreading branches (Kentucky bluegrass) *P. pratensis* L.
- 1 Plants tufted, not rhizomatous, native, mostly in hills; panicles contracted; the branches strongly ascending and rather inconspicuous in the rather dense spikelets
 - 2 Spikelets somewhat flattened; lemmas pilose on at least the marginal nerves; plants long-lived; usually in robust bunches, unisexual, apomictic; the florets all pistillate, producing viable seed without fertilization *P. fendleriana*
 - 2 Spikelets rounded; lemmas at most scabrous, not at all pilose; plants short-lived or long-lived, mostly in small bunches, bisexual, the florets usually with stamens at least when young *P. secunda*

Poa fendleriana (Steud.) Vasey Muttongrass, mutton bluegrass. (*P. longiligula* Scribn. & Williams) Occasional in hills. April through May.

Poa secunda Presl. Sandberg's bluegrass. (*P. sandbergii* Vasey) Occasional to common, mostly in hills. April to mid-June.

**Sitanion Raf.
Squirreltail**

Sitanion hystrix (Nutt.) J. G. Smith Squirreltail. (*Elymus elymoides* [Raf.] Sweezy) Perennials in small tufts, 10-30 (40) cm tall; blades flat or rolled, 1-4 mm wide, often strongly nerved; ligules less than 1 mm long; spikes solitary, terminal, disarticulating at one to several nodes, bristly from the long divergent awns of glumes and lemmas, spikelets 2 per node of the rachis, with 1-6 florets; glumes awnlike their entire length, 3-9 cm long; body of lemmas 7-10 mm long, the awns about as long as those of the glumes. Common but never abundant in black sagebrush communities especially in Antelope Valley, rare to scattered elsewhere. May through June.

**Sporobolus R. Br.
Dropseed**

Warm-season bunchgrasses; leaf sheaths often ciliate on margins near summit; spikelets borne in open or congested panicles, with 1 floret; glumes thin, translucent, shorter than the lemma; lemmas awnless; fruit hard, rounded, falling from the floret at maturity.

- 1 Panicle open and diffuse, the longer branches to over 10 cm long; leaf sheaths ciliate pilose only on the margin near the collar, the collar glabrous; ventral surface of leaf blades often with a row of pilose hairs to 5 mm long just above the ligule *S. airoides*
- 1 Panicle contracted or often included in the upper leaf sheath for the entire length, the branches if spreading mostly less than 5 cm long; leaf sheaths ciliate pilose well below the collar, the collar long pilose well around to the opposite side of the culm from the sheath margins; ventral surface without a row of pilose hairs as above
 - 2 Panicle branches spreading if not confined within the upper sheath; plants 20-50 cm tall *S. cryptandrus*
 - 2 Panicle densely contracted, nearly cylindrical, the branches appressed ascending even when exerted from the upper leaf sheath; plants mostly 50-100 cm tall *S. contractus*

Sporobolus airoides (Torr.) Torr. in Parke Alkali sacaton. Abundant on a few small areas of valley bottoms, rare on sloping fans. June through September. A warm-season grower, thriving on summer rains. Moderately palatable to cattle and sheep in winter.

Sporobolus contractus A. S. Hitchc. Spike dropseed. Common to abundant locally (especially near the SW1/4 of Sec. 16 T25S R17W in Pine Valley), occasional elsewhere on alluvial slopes. May through September. Responding to summer rains. Moderately palatable to cattle and sheep, and in some winters highly palatable.

Sporobolus cryptandrus (Torr.) Gray Sand dropseed. Widespread, valleys and hills, dominant on some older fans, scattered elsewhere. July through September. Responding to summer rains. Similar to *S. contractus* in palatability to cattle and sheep in winter.

Sporobolus asperifolius Nees. (*Muhlenbergia asperifolia* [Nees & Mey.] Parodi) was misapplied to plants of *S. cryptandrus* on 1933 plant community type maps of the DER.

Stipa L. Needlegrass

Perennial bunchgrasses; leaf blades often rolled; spikelets borne in panicles, with a single floret; glumes exceeding and enveloping the body of the lemma, not awned; lemmas rather hard, nearly terete, with a hardened, rather sharp base (callus), hairs of the callus usually longer than those of the body of the lemma; awns of lemmas long, often bent, the lowest segment often twisted.

- 1 Awns about 1-2 cm long; lemmas densely pilose with hairs 2-3 mm long; plants 10-30 cm tall *S. parishii*
- 1 Awns over 2 cm long; lemmas glabrate to sparsely hairy, the hairs less than 2 mm long; plants sometimes over 30 cm tall
 - 2 Awns plumose on lowest segments, 3-4 (5) cm long; ligules fringed-ciliolate, about 0.5 mm long; collars densely pilose *S. speciosa*
 - 2 Awns glabrous or scabrous, 4-16 cm long; ligules not ciliolate, 0.2-5 mm long; collars and sheaths glabrous or scabrous
 - 3 Glumes 7-11.5 mm long; awns of lemmas 4-7.5 cm long, flexuous, not strongly bent; panicles narrow with ascending to appressed branches *S. arida*
 - 3 Glumes 15-20 (35) mm long; awns of lemmas 6-16 cm long, strongly bent; panicles spreading at maturity with widely divergent branches *S. comata*

Stipa arida Jones Mormon needlegrass. Infrequent to occasional, hills, often in colluvium. Mid-May through June.

Stipa comata Trin. & Rupr. var. *comata* Needle-and-thread. Dominant and codominant on areas of deep coarse sandy soils on flats and valley bottoms, and at the foot of steeper slopes, and on finer textured soils on upper benches and in hills in and near the pinyon-juniper zone. Mid-May through June.

Stipa speciosa Trin. & Rupr. Desert needlegrass. Locally common among rocks on Warm Cove Ridge. May through July.

Stipa parishii Vasey var. *depauperata* Jones (*S. coronata* Thurb. var. *depauperata* [Jones] A. S. Hitchc.) Infrequent to occasional in hills. May through June. Plants of the DER and other places in Millard to Tooele Counties, UT, and west to central Nevada represent the extreme for the species in small size (12-25 cm tall), short leaf blades (3-15 cm long), and short awns (1-1.5 cm long). The collars are glabrate to ciliate and not with tufts of long crinkley hairs. Plants with these features are reported by Hitchcock (1951) and Cronquist and others (1977) to be linked through numerous intermediate plants to *Stipa coronata* var. *coronata*, which at its maximum is: 1-2 m tall, with leaf blades 30-50 cm long, with awns 25-42 cm long, and with tufts of long crinkley hairs at the collars of leaves.

POLEMONIACEAE; PHLOX FAMILY

Annual to perennial herbs or subshrubs; leaves opposite or alternate, simple to pinnatifid; corolla united, 5 lobed; stamens 5; stigmas mostly 3-lobed; fruit a capsule.

- 1 Leaves entire, opposite, often crowded, linear or nearly so; plants herbaceous perennials *Phlox*
- 1 Leaves not entire, alternate or opposite; plants various
 - 2 Some of the lower leaves opposite or appearing whorled, palmatifid into linear or needlelike segments, the segments sometimes appearing as fascicles or whorls of filiform leaves; plants perennial subshrubs *Leptodactylon*
 - 2 Leaves alternate, simple to pinnatifid; plants annual to perennial herbs *Gilia*

**Gilia R. & P.
Gilia**

With features of the family and as listed in the key. In addition to the taxa listed below *Eriastrum sparsiflorum* (Eastw.) Mason (*Gilia sparsiflora* Eastw.; *Welwitschia wilcoxii* Rydb.; *W. floccosa* [A. Gray] Rydb. misapplied) might be expected on the DER. The name *Welwitschia* is found on old study sheets of plots on the DER. However, it is more likely that the plants referred to as *Welwitschia* are one of the following annual species of *Gilia*.

- 1 Plants perennial, sometimes appearing annual; leaves entire or trifid or with up to 7 linear entire segments *G. congesta*
- 1 Plants annual; leaves various, but not as above
 - 2 Flowers borne in an open inflorescence, at least some borne on conspicuous pedicels; corollas 4-15 mm long; plants mostly 5-20 cm tall; leaves pinnately lobed to pinnatifid
 - 3 Leaves pinnately lobed or merely toothed, the lobes mostly entire; corollas 4-6 mm long, the lobes often tridentate; plants without tomentum; gland-tipped hairs of the inflorescence not purplish or blackish *G. leptomeria*
 - 3 Leaves pinnatifid, appearing compound, the primary divisions often toothed or lobed; corollas (5) 7-12 (15) mm long, the lobes not tridentate; plants with some cobwebby tomentum at least in axils of leaves or inflorescence with black or dark purplish gland-tipped hairs
 - 4 Plants with some cobwebby tomentum on the leaves or at least in the axils of leaves, mostly on hills *G. inconspicua*
 - 4 Plants with dark gland-tipped hairs, without any cobwebby tomentum, mostly in Pine Valley *G. hutchinsifolia*
 - 2 Flowers sessile or nearly so in a congested inflorescence, or axillary; leaves entire to toothed or lobed; corollas 4-6 mm long; plants 1-5 (10) cm tall
 - 5 Leaves entire or toothed; lower flowers solitary in axils of leaves; stems leafy *G. depressa*
 - 5 Leaves toothed to pinnatifid; flowers all in terminal clusters; the terminal cluster closely subtended by a cluster of leaves that are about as large as those at the base of the plant; stems mostly leafless between the basal and terminal cluster of leaves *G. polycladon*

Gilia congesta Hook. Ballhead gilia. (*Ipomopsis congesta* [Hook.] V. Grant) With two varieties on the DER.

- 1 Leaves trifid to pinnatisect or a few entire, mostly with at least some cobwebby hairs; plants perennial but sometimes appearing annual var. *congesta*
- 1 Leaves entire, glabrous to floccose-tomentose on lower side; plants strongly perennial var. *crebrifolia*

Var. *congesta* Occasional in valleys. May through June.

Var. *crebrifolia* (Nutt.) Gray Locally common on Tunnel Springs Mountain. May through June. Disjunct from southwestern Montana and northern and western Wyoming, or perhaps the plants of Tunnel Springs Mountain, Wah Wah Mountains, and Mountain Home Range of Millard and Beaver Counties represent an unnamed variety.

Gilia depressa Jones Depressed gilia. (*Ipomopsis depressa* [Jones] V. Grant) Occasional in some years in Pine Valley, most specimens seen are from within a half kilometer of Headquarters. May through June.

Gilia hutchinsifolia Rydb. Common in most years on sandy ground in valleys. May through June.

Gilia inconspicua (J. E. Sm.) Sweet. (*G. ophthalmoides* A. Brand; *G. sinuata* Dougl.) Occasional to common at least in some years, mostly in hills. May through June.

Gilia leptomeria Gray Great Basin gilia. Occasional, hills and washes. May through June.

Gilia polycladon Torr. in Emory (*Ipomopsis polycladon* [Torr.] V. Grant) Infrequent but widespread, mostly in washes and on disturbed ground. May through June.

**Leptodactylon H. & A. Prickly Phlox;
Prickly Gilia**

Leptodactylon pungens (Torr.) Nutt. var. *pungens* Prickly phlox. Perennial plants (shrubs or subshrubs) more or less woody at base, 10-40 cm tall; leaves sessile, palmately parted into needlelike divisions, lower ones opposite, the upper ones opposite, subopposite, or alternate, with smaller leaves fascicled in the axils of the primary ones; flowers sessile, solitary or a few in a cluster, showy; corolla white, cream colored, or purplish in

the throat, 15-20 mm long, the tube narrow, the lobes often spirally closed during the day. Infrequent, scattered, mostly along washes. May through June.

**Phlox L. Sweet
William; Phlox**

Perennial herbs; leaves sessile, entire, opposite; flowers solitary or in small clusters; corollas white, pink, or bluish.

- 1 Plants not tufted or mat forming; stems more or less ascending or erect; principal leaves (1) 2-3 (4) cm long, more or less well spaced on the stem and not concealing the internodes; flowers evidently pediceled; styles 6-25 mm long . . . *P. longifolia*
- 1 Plants tufted, forming mounds or mats; stems more or less prostrate or sprawling; principal leaves 2-20 mm long, crowded on the stems, sometimes concealing the internodes; flowers sessile or nearly so; styles various
- 2 Plants densely pubescent with villose or cobwebby hairs, densely pulvinate caespitose; leaves 2-5 mm long; corolla lobes 3-5 mm long *P. muscoides*
- 2 Plants glabrous or sparsely pubescent, loosely mat-forming; leaves 8-30 mm long; corolla lobes 5-8 mm long *P. austromontana*

Phlox austromontana Cov. Desert phlox. Occasional, hills and washes. Late April to mid-June.

Phlox longifolia Nutt. The specimens seen are from the Warm Cove-Halfway Hills area. Plants from the DER are a short-leaved phase and are referable to var. *brevifolia* (Gray) Gray.

Phlox muscoides Nutt. (*P. bryoides* Nutt.; *P. caespitosa* Nutt. spp. *muscoides* Brand.) Occasional to common on fans and hills. March through September.

POLYGALACEAE; MILKWORT FAMILY

**Polygala L.
Milkwort; Polygala**

Low shrubs or subshrubs with spine-tipped twigs (about 5-20 cm tall on the DER); leaves alternate, 8-20 mm long; flowers irregular, borne on or near young spines on slender pedicels; sepals 5, free, the 2 inner ones (wings) much larger than the outer ones, petaloid; petals 3, united into a more or less tubular corolla; stamens mostly 8, the filaments united.

- 1 Flowers about 3 mm long, yellowish to cream, or the sepals purplish at the apex; twigs woody above ground level not dying back to base, covered with whitish hairs, the hairs dense enough to conceal the epidermis; leaves linear spatulate or oblanceolate, 1-3 mm wide, moderately pubescent, not ciliolate *P. acanthoclada*
- 1 Flowers 6-10 mm long; the sepals bright pink-purple, the corolla yellowish; twigs herbaceous or nearly so, and dying back to the base, gray-green, glabrate to moderately puberulent with spreading short hairs, the hairs not dense enough to conceal the epidermis; leaves obovate to elliptic-oblanceolate, 2-6 mm wide, glabrate to puberulent, often sparsely ciliate *P. subspinosa*

Polygala acanthoclada Gray Thorn polygala. Infrequent but widespread, hills and upper parts of fans in Pine Valley. June through September.

Polygala subspinosa Wats. Spiny polygala. Rare but widespread, hills and upper parts of fans. Late April through June.

POLYGONACEAE; BUCKWHEAT FAMILY

**Eriogonum Michx.
Wild Buckwheat;
Eriogonum**

Annual or perennial herbs or shrubs; leaves basal or alternate, simple, entire; inflorescence various; flowers borne few together in involucre, each with a threadlike pedicel, the pedicels included or exerted from the involucre; perianth of a single whorl, parted or deeply cleft into 6 small but more or less petaloid segments (tepals); stamens 6-9; fruit an achene.

- 1 Plants annual; inflorescence usually dichotomously or trichotomously branched or umbellike; leaves all basal
- 2 Leaves greenish or yellow-green on both sides, hirsute; stems, branches, and pedicels with tack-shaped glandular hairs; tepals yellow, densely pubescent externally; involucre on threadlike peduncles up to 15 mm long *E. howellianum*

- 2 Leaves whitish or grayish at least on one side, tomentose or floccose; plants not glandular; tepals white, pinkish, or yellow, but not pubescent externally; involucre sessile or on short (1-3 mm) peduncles
 - 3 Stems and branches tomentose; involucre sessile; tepals white or pinkish
E. palmerianum
 - 3 Stems and branches glabrous or nearly so; involucre sessile or short-peduncled; tepals white, pinkish or yellowish
 - 4 Tepals yellowish or cream; fruit prominently winged *E. hookeri*
 - 4 Tepals white or pinkish; fruit not strongly winged *E. cernuum*
- 1 Plants perennial; inflorescence headlike or branched as above
 - 5 Leaves alternate, not all basal; upright shrubs with stems woody above ground level; inflorescence trichotomously branched; the branches tomentose or floccose *E. microthecum*
 - 5 Leaves all basal; stems not woody above ground level; inflorescence various
 - 6 Inflorescence open, umbellike, trichotomously long-branched; stems and branches glabrous; plants 15-30 cm tall or taller, not mat-forming *E. eremicum*
 - 6 Inflorescence headlike; stems tomentose or floccose; plants 1-15 cm tall, rarely taller, mound-forming or mat-forming dwarf shrubs with woody stems at ground level
 - 7 Leaves ovate to orbicular, about as wide as long, mostly over 4 mm wide, constricted to a conspicuous petiole; scapes 2-20 cm tall; tepals glabrous
E. ovalifolium
 - 7 Leaves linear to elliptic, or at least not over 4 mm wide, sessile or gradually tapered to an indistinct petiole; scapes 0.5-5 cm tall, sometimes not extended beyond the leaves; tepals pubescent
 - 8 Tepals white; leaves mostly with acute tips; plants villous, the epidermis of scapes visible through the spreading hairs *E. villiflorum*
 - 8 Tepals yellow; leaves with rounded tips; plants tomentose-floccose, the epidermis of scapes obscured or nearly so by the dense interwoven hairs *E. shockleyi*

Eriogonum cernuum Nutt. var. *viminale* (Stokes) Reveal in Munz Nodding eriogonum. Occasional to common in some years, valleys and washes. June through September. Responding to summer and early fall precipitation.

Eriogonum eremicum Reveal Desert range eriogonum. Occasional on shallow, rocky soils in hills, mostly on the north half of the DER, endemic to the DER and surrounding parts of southwestern Millard County. The type specimen (N. Holmgren and others 2247) is from the DER. June through September.

Eriogonum howellianum Reveal Howell's eriogonum. (*E. glandulosum* [Nutt.] Nutt. misapplied) Occasional to locally common in some years (not seen every year), fans, washes, roadsides, and low hills between Pine Valley and Tunnel Springs Mountain, endemic to desert ranges of western Utah. July through October. Responding to summer and early fall precipitation.

Eriogonum hookeri Wats. Occasional or at least infrequent in most years, some years rather common especially on the broad fan of Mountain Home Wash east of Warm Cove Ridge. June through September. Responding to summer and early fall precipitation.

Eriogonum microthecum Nutt. Most often seen as a common associate of *Artemisia nova*, more persistent within the crown of *Artemisia* and possibly reduced by sheep grazing in winter. July through September.

Eriogonum ovalifolium Nutt. var. *ovalifolium* Cushion eriogonum. Occasional, mostly in hills and upper parts of fans. May through June.

Eriogonum palmerianum Reveal in Munz The one specimen seen is from the gravelly wash bottom of Mountain Home Wash near Warm Cove Ridge. July through September. Responding to summer and early fall rains.

Eriogonum shockleyi Wats. var. *candidum* (Jones) Reveal Shockley wild buckwheat. Occasional or locally common in hills and upper parts of fans. May through June.

Eriogonum villiflorum Gray Villous-flowered eriogonum. Occasional or locally common, hills and especially Tunnel Springs Mountain. April through June.

Polygonum L. Knotweed

Polygonum aviculare L. Common knotweed. Annual herbs; leaves simple alternate, entire, 5-20 mm long, lanceolate, subtended by scarious sheathing stipules, the sheaths

soon torn; flowers 1-5 in axillary clusters, inconspicuous, the perianth of a single whorl, 2-3 mm long, greenish with pinkish to purplish margins; stamens 8; fruit an achene. Introduced from the Old World, locally common on bottoms of bulldozed basins at the edge of Pine Valley Playa.

POLYPODIACEAE; COMMON FERN FAMILY

***Cheilanthes* Moore**

Cheilanthes feei Moore Fee lipfern. Perennial herbs; leaves arising from a scaly caudex-like subterranean stem, unfolding with fiddle-head shape as they mature; the petioles 3-10 cm long, dark purplish brown, the blades 3-13 cm long, pinnately decomposed, the leaflets pubescent with spreading whitish or tawny multicellular hairs; flowers lacking; reproduction by spores, the spores grouped in sporangia, borne on the lower margins of leaflets. Rare among rocks and in rock crevices, hills.

PORTULACACEAE; PURSLANE FAMILY

***Lewisia* Pursh
Bitterroot; *Lewisia***

Lewisia rediviva Pursh Bitterroot. Perennial herbs from thickened fleshy fascicled roots; leaves basal, fleshy, succulent, simple, entire, linear or at least narrow, nearly terete, 1.5-3 cm long, about 2-4 mm wide; flowers solitary and terminal on scapes 2-5 (7) cm long; scapes with a whorl of bracts, jointed just below the bracts; sepals petaloid, these and the petals about 16-30, 10-35 mm long, white or pinkish; stamens 20-50; fruit a capsule. The one specimen seen is from near the northern boundary of the DER on Tunnel Springs Mountain.

RANUNCULACEAE; BUTTERCUP FAMILY

- 1 Flowers solitary and terminal on leafless scapes; petals pinkish or pink-purple, none spurred; sepals not spurred; fruit of numerous achenes *Ranunculus*
- 1 Flowers 3-several in a raceme; petals and sepals blue, the uppermost sepal projected into an obvious spur; fruit of 3 follicles *Delphinium*

***Delphinium* L.
Larkspur**

Delphinium andersonii Gray Anderson larkspur. Perennial glabrate herbs, 20-40 cm tall, from fascicled roots; leaves palmatifid, distinctly petioled, basal and alternate, reduced in size and number upward on the stems; flowers irregular, the sepals 5, petaloid, the upper one strongly projected into a spur 12-18 mm long; petals in 2 sets of 2 each, the lower 2 narrowed to a claw, the upper 2 prolonged into the spur of the upper sepal; stamens many. Infrequent, mostly in hills. May through June.

***Ranunculus* L.
Buttercup**

Ranunculus juniperinus Jones (*Beckwithia juniperina* [Jones] Heller) Perennial glabrous herbs, 5-15 (20) cm tall, scapose; leaves palmatifid, distinctly petioled, all basal; flowers regular; sepals greenish toward the base, petaloid toward the apex; petals about 12-15 mm long; stamens numerous; achenes numerous, flattened, borne in a headlike cluster on a receptacle. Infrequent or occasional in hills and especially on Tunnel Springs Mountain in shade and duff of pinyon and juniper. March to mid-May, often flowering at the edge of melting snow.

ROSACEAE; ROSE FAMILY

Shrubs (on DER); leaves alternate or basal, sometimes fascicled, sessile or gradually tapered to an indistinct petiole; flowers and fruit extremely variable.

- 1 Plants not over 15 cm tall; leaves in basal rosettes *Petrophytum*
- 1 Plants over 15 cm tall; leaves not in basal rosettes
 - 2 Leaves entire or with a few inconspicuous teeth, not over 6 mm wide; fruit various
 - 3 Petals lacking; fruit an achene with a plumose style 1-3 cm long; leaves so tightly rolled (revolute) that the lower surface is hidden except sometimes for the midrib, not deciduous in winter or dry part of summer, rather leathery, dark green and glabrous or glabrate on the upper (exposed) surface *Cercocarpus*
 - 3 Petals 3.5-5 mm long; fruit a drupe, the style less than 1 cm long, not plumose; leaves flat, not rolled, deciduous by winter and perhaps by drought in some years, not leathery, green, usually sparsely pubescent on both sides *Prunus*

- 2 Leaves lobed or if only toothed then regularly and conspicuously so and usually some over 6 mm wide; fruit an achene
- 4 Leaves (3) 5 lobed, glandular; petals 5-9 mm long, showy individually; achene with a plumose tail 2-6 cm long *Cowania*
- 4 Leaves toothed on the upper half, not glandular; petals about 2 mm long; achenes without plumose tails *Holodiscus*

***Cercocarpus* H. B. K. Mountain-Mahogany**

Cercocarpus intricatus Wats. Littleleaf cercocarpus, littleleaf mountain-mahogany, rockbrush. (*Cercocarpus ledifolius* Nutt. var. *intricatus* [Wats.] Jones) Shrubs 50-100 (150) cm tall, intricately branched; leaves 3-18 mm long; flowers inconspicuous, spicy fragrant; stamens 10-20. Common to dominant, on steeper rocky hills and especially on Tunnel Springs Mountain in the pinyon-juniper zone. May through June. Palatable sheep feed in winter.

***Cowania* D. Don Cliffrose**

Cowania mexicana D. Don var. *stansburiana* (Torr.) Jeps. Stansbury cliffrose. (*C. stansburiana* Torr.) Shrubs, 0.6-3 m tall, with shreddy bark and glandular branchlets; leaves 3-15 mm long, fan-shaped, with 3-5 lobes, glandular punctate and green above, white tomentose beneath; petals white, cream, or yellow; each flower usually producing (3) 5 achenes. Infrequent, scattered in rocky hills and near drainage channels in the upper parts of some alluvial fans. June. Some plants hedged by sheep in winter and by antelope.

***Holodiscus* Maxim. Mountain Spray**

Holodiscus dumosus (Nutt.) Heller (*H. microphyllus* Rydb.; *Sericotheca dumosa* [Nutt.] Rydb.) Shrubs 0.5-1.5 m tall; leaves 5-32 mm long, 2-23 mm wide, obovate to elliptic, toothed on the upper half, more or less wedge-shaped on the mostly entire lower half; flowers numerous in panicles, individually inconspicuous but the densely flowered panicles showy; petals white, cream, or pinkish, about 2 mm long. Known from Tunnel Springs Mountain near northern boundary of DER, north side of rock outcrops. June through July.

***Petrophytum* Nutt. in T. & G.**

Petrophytum caespitosum (Nutt.) Rydb. Tufted rockmat. (*Spiraea caespitosa* Nutt. in T. & G.; *Eriogyna caespitosa* [Nutt.] Wats.) Plants woody at base, forming pale-colored mats or mounds, the woody stems remaining on rocks or at ground level, aerial stems scapose, not woody; leaves in basal rosettes, simple, entire, 3-17 mm long, 1.5-4.5 mm wide, spatulate to obovate, pilose on one or both sides or rarely glabrous; scapose peduncles 0.5-10 cm tall, with bractlike leaves; flowers in a 5-25 mm long spikelike panicle, small but showy collectively; petals about 1-3 mm long, white; fruit of usually 5 follicles. Occasional on rock faces of Tunnel Springs Mountain and on white volcanic rock outcrops to the south and east of the mountain. August through October.

***Prunus* L. Cherry; Plum; Almond**

Prunus fasciculata (Torr.) Gray Desert almond, desert peachbrush. (*Emplectocladus fasciculatus* Torr.) Shrubs 30-150 cm tall; branchlets ashy or grayish, pubescent, more or less thornlike; leaves 5-25 mm long, 1-6 mm wide, entire or with a few small teeth near the apex, short-pointed at apex; petals white to cream; fruit about 7-10 mm long, ovoid, hairy. Scattered on steep rocky slopes of canyons and sometimes hillsides and abundant in many washes across the slopes of fans and well out into the valleys. May through June. At least a few plants blossom each year, but fruit production is rather rare. Not browsed in winter, but leaves and twigs provide a substantial proportion of the summer diet of antelope. Tent caterpillars (*Malacosoma* sp.) are usually present on a few shrubs in the early spring, and in some years they are so numerous as to delay the appearance of foliage for a month or more. The shrubs have shown no long-term ill effect from such severe defoliation.

RUBIACEAE; MADDER FAMILY

***Galium* L. Bedstraw; Cleavers**

Galium multiflorum Kellogg var. *multiflorum* Shrubby bedstraw. Perennial plants more or less woody at the base, 10-30 cm tall; leaves in whorls of 4, sessile, linear to broadly ovate, mostly short-pointed at apex, 5-20 mm long, the midrib prominent; flowers unisexual, small, inconspicuous, few in the axils of leaves, with short pedicels; corolla united, 2-4 mm wide; ovary and fruit covered with spreading straight or flexuous hairs. Infrequent in rocky outcrops and rocky places on Tunnel Springs Mountain. May through June.

SAXIFRAGACEAE; SAXIFRAGE FAMILY

- 1 Plants scapose forbs *Heuchera*
 1 Shrubs with alternate leaves *Ribes*

Heuchera L.
 Alumroot; Heuchera

Heuchera rubescens Torr. in Stansb. Red alumroot. Herbs 5-30 cm tall, clothed at the base with persistent leaf bases; leaves all basal, simple, the petioles 1-6 cm long, the blades 0.7-4 cm long, orbicular to broadly ovate, cordate or truncate at the base, palmately lobed, the primary lobes often again lobed, dentate or crenate; flowers in racemose or spicate panicles; floral tube short, reddish or pinkish, bearing small calyx lobes, petals, and stamens; petals 3-4 mm long, white; stamens exserted; fruit a capsule, 4-6 mm long. Infrequent or locally common in crevices of rock outcrops, mostly on north exposures, specimens seen are all from Tunnel Springs Mountain. May through June.

Ribes L. Currant;
 Gooseberry

Ribes cereum Dougl. Wax currant. Shrubs 30-150 cm tall; twigs pilose-villous and stipitate-glandular; leaves simple, the petioles 4-22 mm long, the blades 5-30 mm long, orbicular to reniform, cordate or truncate, with 3-7 shallow lobes, the lobes crenate or dentate; inflorescence a raceme with 2-3 flowers; floral tube 4-11 mm long, pinkish, bearing small petaloid sepals, petals, and stamens; fruit a berry, crowned by the withered flower. Rare, rocky canyons and hillsides of Warm Cove Ridge and Tunnel Springs Mountain. May through June. Often included in Grossulariaceae (currant or gooseberry family).

SCROPHULARIACEAE; FIGWORT FAMILY

Annual or perennial herbs; leaves extremely variable; corolla united, tubular, mostly irregular; fertile stamens 4; fruit a 2-chambered capsule.

- 1 Leaves opposite, simple, entire to toothed; fertile stamens 4, a 5th stamen modified into a sterile staminode; plants glabrous to puberulent, or with viscid-villous hairs *Penstemon*
 1 Leaves alternate, at least some deeply lobed to pinnatifid or trifid; stamens 4, staminode lacking; plants mostly with viscid-villous hairs at least in the inflorescence
 2 Leaves pinnately lobed to pinnatifid, with more than 7 lobes, 3-15 cm long, the basal ones tufted and exceeding the inflorescence, the lobes rounded, crenate, the rounded teeth often with smaller whitish-margined dentate teeth; corolla more showy than the calyx or bracts *Pedicularis*
 2 Leaves 3-5 cleft or 3-5 lobed, the lower ones sometimes entire, the basal tuft lacking or not exceeding the inflorescence, the linear or acute lobes or segments entire or toothed but not crenate
 3 Plants perennial; inflorescence red, lower leaves often entire, the upper ones 3-7 lobed or cleft, the divisions narrowly triangular to linear but hardly filiform; stems not branched above the base *Castilleja*
 3 Plants annual; inflorescence not red; lower and upper leaves dissected, the segments more or less linear or filiform; stems branched in the inflorescence *Cordylanthus*

Castilleja Mutis
 Indian Paintbrush

Inflorescence with red showy bracts and calyces; corollas narrow, greenish and comparatively inconspicuous.

- 1 Plants 5-15 cm tall; the greenish corolla (25) 30-40 mm long, well exserted beyond the linear to lanceolate, reddish bracts, and conspicuous in the rather short broad inflorescence *C. scabrida*
 1 Plants 20-30 cm tall; the greenish corolla 20-30 (35) mm long, mostly or nearly concealed in the lanceolate to broadly ovate reddish bracts; inflorescence short and broad at first, later elongating *C. chromosa*

Castilleja scabrida Eastw. var. *barnebyana* (Eastw.) N. Holmgren Dolomite Indian paintbrush. (*C. barnebyana* Eastw.) Infrequent to locally common, Tunnel Springs Mountain, crevices of rocks and rocky (dolomite) slopes and ridges, usually in pinyon-juniper and littleleaf mountain-mahogany communities. April through June.

Castilleja chromosa A. Nels. Desert Indian paintbrush. (*C. angustifolia* [Nutt.] G. Don var. *collina* [A. Nels.] Garrett; *C. a.* var. *dubia* A. Nels.) Infrequent or occasional in hills. April through June.

***Cordylanthus* Nutt.**
Birdbeak;
Clubflower

Cordylanthus kingii Wats. var. *kingii* King's birdbeak. (*Adenostegia kingii* [Wats.] Greene) Annual herbs 5-15 (20) cm tall, from a yellowish taproot; herbage pubescent; leaves cleft into narrow divisions; flowers in dense terminal clusters; calyx cleft to the base in front and extending behind the corolla as a bractlike structure with a bifid apex; corolla 2-lipped, dull pinkish-purple, 16-20 mm long, subtended by a solitary 5-7 parted bract. The one specimen is from a black sagebrush-Greene's rabbitbrush community in the bottom of Antelope Valley at the western edge of the DER. July through September.

***Pedicularis* L.**
Lousewort

Pedicularis centranthera Gray in Torr. Dwarf lousewort. Perennial herbs, 5-15 cm tall; leaves nearly linear in outline, deeply lobed to pinnatifid, rather crowded, the petioles 1-4 cm long or longer, the blades 2-10 cm long; flowers in dense clusters, the clusters often overtopped by leaves; corollas well exerted from the calyx, 25-30 mm long, strongly 2-lipped, the upper lip arched and longer than the lower one, dull pink-purple. Infrequent or locally common, Tunnel Springs Mountain, pinyon-juniper woodlands. April through May.

***Penstemon* Mitch.**
Beardtongue;
Penstemon

With features of the family and key. Note: Plants with white corollas are rarely encountered in most taxa.

- 1 Plants 40-100 cm tall or taller, glabrous and glaucous below the inflorescence; leaves all conspicuously toothed with coarse teeth; corollas 22-35 mm long, whitish or pinkish with darker lines; staminode exerted, shaggy-bearded; capsules 10-14 mm long *P. palmeri*
- 1 Plants 3-20 (30) cm tall, glabrous or pubescent; leaves entire or with a few small teeth; corollas 8-20 mm long, variously colored; staminode various
 - 2 Plants glabrous and glaucous; the corollas occasionally obscurely glandular externally; staminode pale, flat and somewhat recurved, glabrous or sparsely pubescent; corollas pink-lavender *P. confusus*
 - 2 Plants pubescent either throughout or at least in the inflorescence, the stems often with retrorse hairs; corollas glandular to pubescent externally; staminode pubescent
 - 3 Lower leaves glabrous, linear to linear-oblongate, narrower or as wide as those of the inflorescence, 3-5 (7) cm long, those of the inflorescence glabrate to puberulent, a few more or less toothed; stems puberulent below the inflorescence; inflorescence densely pubescent with flattened viscid hairs; corollas 8-11 mm long, shorter than the subtending leaves or bracts, violet with darker violet lines, with dense tufts of pale long hairs internally or near the mouth; anthers exerted at least to the sinuses of the corolla lobes, widely spreading from each other at maturity; staminode exerted from the corolla, bearded with white or pale hairs *P. concinnus*
 - 3 Lower and upper leaves puberulent, entire, the lower ones wider than linear-oblongate, mostly as wide or wider than those of the inflorescence; inflorescence glandular or not; corollas 10-20 mm long, shorter or longer than the subtending leaves or bracts, blue, without dense tufts of pale long hairs; anthers various; staminode included or just equaling the corolla, variously bearded
 - 4 Inflorescence with viscid flattened hairs; anthers remaining horseshoe-shaped even in age, deeply included in the corolla, just equaling the tube or barely exerted into the limb; staminode included in the limb of the corolla, densely bearded with bright yellow or orange-yellow, long hairs; corolla 10-15 mm long, glandular externally, glabrous or sparsely pubescent internally *P. nanus*
 - 4 Inflorescence densely puberulent but without viscid hairs; anthers widely spreading, about equaling the corolla; staminode about equaling the corolla, moderately bearded with white or pale yellow hairs; corolla 14-20 mm long, glandular externally, sparsely pubescent internally in lines with short yellowish hairs *P. dolius*

Penstemon concinnus Keck. Desert range beardtongue. Rare (on DER) west of and west side of Tunnel Springs Mountain; the type (Cottam 5634) from Tunnel Springs Mountain, endemic to southwestern Millard County and western Beaver County, UT, and possibly adjacent Nevada. May through June.

Penstemon confusus Jones Pale penstemon. Occasional, hills, fans, and gravelly washes, mostly on or near Tunnel Springs Mountain. May through June.

Penstemon dolius Jones ex Pennell Jones penstemon. Infrequent or occasional, the few specimens seen are from Halfway Summit and Tunnel Springs Mountain. May through June.

Penstemon nanus Keck Dwarf beardtongue. Occasional, hills and upper parts of fans, endemic to Beaver and Millard Counties, UT, around Tunnel Springs Mountain; the type (Plummer 7413) from the DER. May through June.

Penstemon palmeri Gray Palmer penstemon. Infrequent along raw banks of Mountain Home Wash. May through June.

SECTION III: REFERENCES

- Abrams, Leroy. An illustrated flora of the Pacific States, Washington, Oregon, and California. 4 vols. Stanford, CA: Stanford University Press; 1923-1960.
- Cronquist, Arthur; Holmgren, Arthur H.; Holmgren, Noel H.; Reveal, James L. Intermountain flora. Vol. 1. New York: Hafner Publishing; 1972. 270 p.
- Cronquist, Arthur; Holmgren, Arthur H.; Holmgren, Noel H.; Reveal, James L.; Holmgren, Patricia K. Intermountain flora. Vol. 6. New York: Columbia University Press; 1977. 584 p.
- Cronquist, Arthur; Holmgren, Arthur H.; Holmgren, Noel H.; Reveal, James L.; Holmgren, Patricia K. Intermountain flora. Vol. 4. New York: The New York Botanical Garden; 1984. 573 p.
- Hitchcock, A. S. Manual of the grasses of the United States. 2d ed., revised by Agnes Chase. Miscellaneous Publication 200. Washington, DC: U.S. Department of Agriculture; 1951. 1051 p.
- Hitchcock, C. Leo; Cronquist, Arthur; Ownbey, Marion; Thompson, J. W. Vascular plants of the Pacific Northwest. Publications in Biology. Vol. 17, 6 parts. Seattle: University of Washington; 1955-1969.
- Holmgren, Patricia K.; Keuken, Wil; Schofield, Eileen K. Index Herbariorum, part 1, the herbaria of the world. 7th ed. Regnum Vegetabile. 106: 1-452; 1981.
- Kearney, Thomas H.; Peebles, Robert H. Arizona flora. Berkeley, CA: University of California Press; 1969. 1085 p.
- Munz, Philip A. A California flora. Berkeley, CA: University of California Press; 1968. 1681 p.
- Tidestrom, Ivar. Flora of Utah and Nevada. Contributions from the U.S. National Herbarium. Vol. 25. [Washington, DC]: United States National Museum, Smithsonian Institution; 1925. 665 p.
- U.S. Department of Agriculture, Agricultural Research Service; U.S. National Herbarium. Contributions toward a flora of Nevada. Beltsville, MD: U.S. Department of Agriculture, Agricultural Research Service, Plant Industry Section; Washington, DC: U.S. National Arboretum; 1940-1965. [Series of 50 papers.]
- Welsh, Stanley L. Utah flora: Fabaceae (Leguminosae). Great Basin Naturalist. 38: 225-367; 1978.
- Welsh, Stanley L. Utah flora: Malvaceae. Great Basin Naturalist. 40: 27-37; 1980.
- Welsh, Stanley L. Utah flora: miscellaneous families. Great Basin Naturalist. 40: 38-58; 1980.
- Welsh, Stanley L. Utah flora: Rosaceae. Great Basin Naturalist. 42: 1-44; 1982.
- Welsh, Stanley L. Utah flora: Compositae (Asteraceae). Great Basin Naturalist. 43: 179-357; 1983.
- Welsh, Stanley L.; Reveal, James L. Utah flora: Brassicaceae (Cruciferae). Great Basin Naturalist. 37: 279-364; 1977.

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INTERMOUNTAIN RESEARCH STATION

The Intermountain Research Station provides scientific knowledge and technology to improve management, protection, and use of the forests and rangelands of the Intermountain West. Research is designed to meet the needs of National Forest managers, Federal and State agencies, industry, academic institutions, public and private organizations, and individuals. Results of research are made available through publications, symposia, workshops, training sessions, and personal contacts.

The Intermountain Research Station territory includes Montana, Idaho, Utah, Nevada, and western Wyoming. Eighty-five percent of the lands in the Station area, about 231 million acres, are classified as forest or rangeland. They include grasslands, deserts, shrublands, alpine areas, and forests. They provide fiber for forest industries, minerals and fossil fuels for energy and industrial development, water for domestic and industrial consumption, forage for livestock and wildlife, and recreation opportunities for millions of visitors.

Several Station units conduct research in additional western States, or have missions that are national or international in scope.

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Logan, Utah (in cooperation with Utah State University)

Missoula, Montana (in cooperation with the University of Montana)

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