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Endangered and threatened plants of Utah: a reevaluation

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ENDANGERED AND THREATENED PLANTS OF UTAH: A REEVALUATION

Stanley L. Welsh

Abstract.—Endangered and threatened plants of Utah are reevaluated. The lists are brought up to date, and species now known to be common are recommended to be removed from the proposed lists. Additional species are proposed to be added, including the new species, Astragalus montii Welsh.

Passage of the Endangered Species Act of 1973 (Public Law 23-205) provided the legal basis for establishment of lists of endangered and threatened plant species. Such lists were prepared under the direction of the Smithsonian Institution, and were published in the Federal Register (40: 27834-27924. 1975; 41: 24524-24572. 1976). These lists are preliminary and were based on best information available at the time. Much information has been developed since those lists were published, and since the work by Welsh, Atwood, and Reveal (1975) was completed in summary form.

This paper is written in an attempt to evaluate the status of rare plants in Utah based on current best information. Several plant species were placed on initial listings which are known to be commonplace. Others were omitted by error, oversight, or lack of information. Taxa have been described as new which were unknown at the time lists were first compiled. All of these factors must be considered, and the lists should be maintained to be as current as possible.

Constraints placed on federal land management agencies provide justification for continued work on the status of rare plants judged to be categorized as either endangered or threatened. All such agencies must consider the presence of such plant species before any land use planning can be accomplished. This constraint applies to all developments which take place on federally controlled lands.

Information on the nature of endangered and threatened plants in Utah must be explored on a continuous basis, since stability of plant populations is an ideal only; they fluctuate with the many variables of climate, biotic, edaphic, and human developmental factors. The philosophy of humanity wishing to preserve plant species of unknown value has been questioned by many people. Examples of construction projects being halted when endangered plant or animal species have been found serve to fuel a controversy in our utilitarian society. Idealistically, industrial and other kinds of development should be able to proceed without regard to any living species—whether plant or animal. Since that is not possible in many instances, then which should give way? A “three worms” argument can be brought to focus. Human enterprise should not be halted, or even seriously modified because of the presence on the site of anything as insignificant as “three worms.” Therein lies the problem. Our basic ignorance of the nature and role

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of rare organisms in the ecosystem, and their place in the lives of mankind, should cause us to allow sufficient time to explore the possibilities.

The fact that extinction is a reasonable practice in nature is pointed to by knowledgeable people as an excuse for the reduction of those species encountered in the course of human expansion onto the natural plant communities of the earth. That plant life has been retreating because of utilization of lands for agriculture, cities and towns, industrial sites, thoroughfares, and other ancillary features of our culture is hardly in doubt. That certain plant species have been pushed to the point of extinction is apparent, but the question remains as to whether extinction by natural processes and that accelerated by our actions represent two kinds of events. Only the end results are the same. Natural extinction represents the removal, in a selective manner, of organisms which, commonly because of conditions of the environment, could not continue to reproduce in sufficient numbers as to maintain a viable population. Forced extinction involves wholesale removal or modification of indigenous plant communities, resulting in the death of populations. This latter type of extinction can involve both inadvertant and purposeful exploitation and has been justified on the basis of necessity—the greatest good for the largest number of human inhabitants. Exploitation without understanding of natural processes has led to catastrophes affecting both human and biotic populations.

Now, we are at a point in civilization where an awareness has developed that living things represent a finite resource which cannot be pressed endlessly into a shrinking environment without loss of substantial numbers of species. Lands considered as good for little except limited grazing in the first century of our occupation of Utah are now important as industrial sites and for resource exploitation, recreation, and other uses.

Prior to the establishment of the Endangered Species Act, expansion onto wild lands took place without regard to rare or unusual plants. It was easy to work without restrictive regulations, regardless of the consequences to plant populations. The cost of such a mode of operation was presumed to be advantageous in our competitive society, but was potentially high in cost of a basic natural resource—our rare plant species. They became endangered from human expansion for two reasons: ignorance of their existence and of their importance.

Given the opportunity of passing the costs of expansion on to future generations, or of bearing those costs at the present time, the present generation will likely defer the costs to the latter. Cost is not in monies alone, but involves all of our resources, including rare plants of unknown value. The Endangered Species Act provides an advocate for present and future generations, allowing all a chance to make determinations and to enable examination of rarities provided in our natural system. The costs of protection will be borne by all generations. Guaranteed is the possibility for pursuit of knowledge about rare plants, now and in the future. All of our indigenous plant species are a part of our heritage. We have driven some vegetative types and species to the edge of extinction. The loss of a few square kilometers of some widespread species can be tolerated because of the large extent of that type. However, the loss of a few square meters of a rare plant population can result in extinction. The Endangered Species Act stands to prevent extinction.

The lands have become increasingly valuable, and the indigenous plants will retreat to still smaller areas as demands are made for greater utilization of Utah lands.

Rarity of plant species is a concept which requires study. Utah is a large state with a great many habitat types in a vast elevational range. Botanical exploration of its lands was begun seriously only a century ago, and students of its flora have been relatively few. Only about a half dozen botanists have ever collected more than 5,000 numbers each from the confines of the state. Catalogues of the flora have always been incomplete because of the poorly known nature of the plant species. Numerous taxa have been described since 1950, and likely many more remain to be discovered. When a plant species is first recog-
Welsh: Endangered Utah Plants

Endangered, its total range is likely known from a small to a very small area. Because of the small size of the known range, the plant is judged to be rare. Further exploration frequently demonstrates that the total range is larger than initially indicated. However, there are those species which occupy narrow ranges, usually on peculiar substrates, which are actually rare.

At the present, the knowledge of Utah plant species is only moderately developed. The distribution of common plants is fairly well documented, but the rare and purportedly rare plants require much additional work. The following summary lists represent the current information available on both proposed and candidate endangered and threatened species of plants in Utah.

Endangered Plant Lists and Proposed Modifications

The current list of proposed endangered plants is presented in Table 1. Some 68 species, including 4 which are possibly extinct, are included. Evaluation of previous data and of that taken from recent collections indicates that the list should be modified. It is therefore proposed that some 12 species be downgraded to the status of threatened and

<table>
<thead>
<tr>
<th>Endangered Plants</th>
<th>Locality</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allium passeyi Holmgr. &amp; Holmgr.</td>
<td>Box Elder</td>
<td>no change</td>
</tr>
<tr>
<td>Arctomecon humilis Coville</td>
<td>Washington</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus cronquistii Barneby</td>
<td>San Juan</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus desereticus Barneby</td>
<td>Sanpete (PoEx)</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus detrivalis M.E. Jones</td>
<td>Duchesne, Uintah</td>
<td>downgrade to T</td>
</tr>
<tr>
<td>Astragalus hamiltonii C.L. Porter</td>
<td>Uintah</td>
<td>downgrade to T</td>
</tr>
<tr>
<td>Astragalus harrisonii Barneby</td>
<td>Wayne</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus iselyi Welsh</td>
<td>Grand, San Juan</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus lentiginosus Doug. var. chartaceus M.E. Jones</td>
<td>Sevier, Sanpete, Juab, Summit, Daggett</td>
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</tr>
<tr>
<td>var. ursinus A. Gray</td>
<td>Iron (?)</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus loanus Barneby</td>
<td>Garfield, Piute, Sevier, Wayne</td>
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</tr>
<tr>
<td>Astragalus lutosus M.E. Jones</td>
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<td>no change</td>
</tr>
<tr>
<td>Astragalus malacoides Barneby</td>
<td>Kane, Garfield</td>
<td>downgrade to T</td>
</tr>
<tr>
<td>Astragalus minthorniae (Rydb.) Jeps. var. gracilior (Barneby) Barneby</td>
<td>Emery, Garfield, Wayne</td>
<td>taxonomic synonym of Astragalus ensiformis M.E. Jones</td>
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<tr>
<td>Astragalus pardalinus (Ryd.) Barneby</td>
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<td>no change</td>
</tr>
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<td>Astragalus perianus Barneby</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td>Astragalus saurinus Barneby</td>
<td>Garfield, Iron, Piute, Wayne</td>
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</tr>
<tr>
<td>Astragalus serpens Barneby</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td>Castilleja aquariensis N. Holmgr.</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td>Castilleja revelatai N. Holmgr.</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td>Cryptantha breviflora (Osterh.)</td>
<td>Daggett, Uintah</td>
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</tr>
<tr>
<td>Payson</td>
<td>Duchesne</td>
<td>no change</td>
</tr>
<tr>
<td>Cryptantha grahamii Johnst.</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td>Cryptantha johnstonii Higgins</td>
<td>Emery</td>
<td>downgrade to T</td>
</tr>
<tr>
<td>Cryptantha jonesiana (Payson)</td>
<td>Emery</td>
<td>no change</td>
</tr>
<tr>
<td>Payson</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td>Cryptantha ochroleuca Higgins</td>
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</tr>
<tr>
<td>Cuscuta warneri Yunker</td>
<td>Grand, Emery</td>
<td>no change</td>
</tr>
<tr>
<td>Cycladenia humilis Benth. var. jonesii (Eastw.) Welsh &amp; Atwood</td>
<td>Iron</td>
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</tr>
<tr>
<td>Cymopterus minimus (Mathias) Mathias</td>
<td>Washington</td>
<td>no change</td>
</tr>
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Table 1.— contd.

<table>
<thead>
<tr>
<th>Endangered Plants</th>
<th>Locality</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Erigeron flagellaris</em> Gray</td>
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</tr>
<tr>
<td>var. <em>trilobatus</em> Cronq.</td>
<td>San Juan</td>
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</tr>
<tr>
<td><em>Erigeron kachinensis</em> Welsh &amp; Moore</td>
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</tr>
<tr>
<td><em>Erigeron maguirei</em> Cronq.</td>
<td>Kane, Washington</td>
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</tr>
<tr>
<td><em>Erigeron religiosus</em> Cronq.</td>
<td>Washington</td>
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</tr>
<tr>
<td><em>Erigeron zionis</em> Cronq.</td>
<td>Millard</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum amnophillum</em> Reveal</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td>var. <em>darcidesei</em> Reveal</td>
<td>Carbon</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum artemisiae</em> Barneby</td>
<td>Prute, Garfield</td>
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</tr>
<tr>
<td><em>Eriogonum cronquistii</em> Reveal</td>
<td>Garfield</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum ephedroides</em> Reveal</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum humicattans</em> Reveal</td>
<td>San Juan</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum hypophillum</em> Reveal &amp; Brotherson</td>
<td>Duchesne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum intermontanum</em> Reveal</td>
<td>Grand, Emery, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum lancifolium</em> Reveal &amp; Brotherson</td>
<td>Carbon</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum loganum</em> A. Nels.</td>
<td>Cache</td>
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</tr>
<tr>
<td><em>Eriogonum smithii</em> Reveal</td>
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<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum zionis</em> J.T. Howell</td>
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<td>no change</td>
</tr>
<tr>
<td>var. <em>zionis</em></td>
<td>Emery (?) Sanpete (PoEx)</td>
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<td><em>Festuca dasyclada</em> Hackel</td>
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</tr>
<tr>
<td><em>Gilia caespitosa</em> A. Gray</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Glauconcarpus suffrutescens</em> (Rollins)</td>
<td>Duchesne, Uintah</td>
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</tr>
<tr>
<td><em>Hermidium alipes</em> S. Wats. var. <em>pallidum</em> C.L. Porter</td>
<td>Washington, no change Garfield</td>
<td>no change</td>
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<tr>
<td><em>Lepidium barnegyanum</em> Reveal</td>
<td>Duchesne, Uintah</td>
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</tr>
<tr>
<td><em>Lygodium grandiflora</em> (Nutt.) Torr. &amp; <em>Gray var. stricta</em> Maguire</td>
<td>Carbon</td>
<td>check taxonomic status remove from list</td>
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<tr>
<td><em>Parthenium aelistatum</em> (M.E. Jones)</td>
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</tr>
<tr>
<td>Barneby</td>
<td>Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Pedioacactus silleri</em> (Engelm.) L. Benson</td>
<td>Beaver, Millard</td>
<td>downgrade to T</td>
</tr>
<tr>
<td><em>Penstemon concinnus</em> Keck</td>
<td>Duchesne (?) Wasatch</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon garrettii</em> Pennell</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon grahamii</em> Keck</td>
<td>Beaver, Millard</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon nanus</em> Keck</td>
<td>Utah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Phacelia argillacea</em> Atwood</td>
<td>San Juan, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Phacelia indecora</em> J.T. Howell</td>
<td>Kane</td>
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</tr>
<tr>
<td><em>Phacelia manumillariansis</em> Atwood</td>
<td>Carbon, Duchesne, Emery, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Physaria grahamii</em> Morton</td>
<td>Kane</td>
<td>no change</td>
</tr>
<tr>
<td><em>Potoroa epipsila</em> Barneby</td>
<td>Garfield (PoEx)</td>
<td>no change</td>
</tr>
<tr>
<td><em>Ranunculus aceriformis</em> A. Gray var. <em>aestivialis</em> L. Benson</td>
<td>Duchesne, Uintah</td>
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</tr>
<tr>
<td><em>Sclerocactus glaucus</em> (K. Schum) L. Benson</td>
<td>Emery, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Sclerocactus Wrightii</em> L. Benson</td>
<td>Sevier</td>
<td>no change</td>
</tr>
<tr>
<td><em>Toumenda aprica</em> Welsh &amp; Reveal</td>
<td>Kane</td>
<td>no change</td>
</tr>
<tr>
<td><em>Vigilena soliceps</em> Barneby</td>
<td>Grand, Kane, San Juan</td>
<td>downgrade to T</td>
</tr>
</tbody>
</table>
some 8 be removed altogether from consideration as potentially endangered or threatened. Two additional species, now listed as threatened, should be upgraded to endangered. Those which should be downgraded include the following:

**Downgraded Species**

*Astragalus detritalis.*—This species is nowhere abundant in the Uinta Basin, but is broadly distributed, commonly on gravels from the vicinity of Duchesne east into Colorado.

*Astragalus hamiltonii.*—The Hamilton milkvetch occurs on the Wasatch Formation west of Vernal and alluvium over a relatively large area north to the vicinity of Tridell.

*Astragalus malacoides.*—This milkvetch is known from the vicinity of Fifty Mile Mountain on the Straight Cliffs plateau west to Four Mile Bench, and from the Circle Cliffs portion of Garfield County.

*Astragalus saurinus.*—Named from Dinosaur National Monument, where the plant is locally abundant on saline soils of several geological formations, *A. saurinus* is also known from as far south as Red Wash and from west of Vernal.

*Cryptantha grahamii.*—The Graham cryptantha is known from the environs of Willow and Hill creeks and from west of the Green River north of the junction of Willow Creek. The total range is somewhat more than 30 miles in length.

*Cryptantha jonesiana.*—This showy cryptantha is known from the Sinbad member of the Moenkopi Formation near the San Rafael River south to the middle of the San Rafael Swell. The plants grow on shaly barrens, often in the pinyon-juniper or mixed desert shrub communities.

*Eriogonum corymbosum var. reveali- num.*—This wild buckwheat has been shown to occur through the East Fork of the Sevier River and Otter Creek vicinities in both Piute and Garfield counties.

*Eriogonum ephedroides.*—The ephedra wild buckwheat is rare only in collections. It is known to occur in a rather broad area from western Colorado west to the Green River in Uintah County, Utah. The habitat is confined to Green River Shale. Plants occur in peculiar assemblages with *Artemisia pygmaea*, *Glaucocarpum suffrutescens*, *Cryptantha grahamii*, *Cryptantha barnebyi*, and many other unusual plants.

*Eriogonum zionis var. zionis.*—This pretty wild buckwheat is known from the White Cliffs escarpment in western Kane and eastern Washington counties. The total known range is more than 40 miles long, and consists of numerous disjunct populations.

*Penstemon concinnus.*—The range of this Great Basin endemic occurs in western Millard and Beaver counties. Although rarely collected, the plants are rather widely distributed in the Tunnel Springs, Mountain Home, and Needle ranges, and on the badadas in both Pine and Hamblin Valleys.

*Penstemon nanus.*—The dwarf beard-tongue occurs with *P. concinnus*, but extends east across the Pine Valley into the Wah Wah Mountains.

*Zigadenus vaginatus.*—The sheathed death camus occurs in disjunct populations, commonly in hanging gardens in San Juan and Grand counties. It is less frequent in those mesophytic assemblages than is *Primula specicola* or *Mimulus eastwoodiae*.

**Delisted Species**

Plants which should be removed (delisted) from the list of endangered species are as follows:

*Astragalus lentiginosus var. chartaceus.*—The papery speckled milkvetch remained obscure for more than half a century following its naming. Recent collections indicate the presence of a series of populations with compact inflorescences shorter than the leaves in the near vicinity of the type locality of this variety. They are connected to other populations which are uncommon but scattered through much of northern Utah.

*Astragalus loanus.*—The Loa milkvetch is another species whose identity long remained obscure. Collected first a century ago, the species was not named until the 1940s. The plants occur on volcanic gravels in Sevier, Piute, Wayne, and Garfield counties. Total extent of known range is almost 100 miles in length.
Astragalus pardalinus.—The panther milkvetch is a mirrored image species of both A. pubentissimus and A. sabulonum. Differences were observed by P. A. Rydberg, who described A. pardalinus, and were substantiated by R. C. Barneby, who placed it in Astragalus. The habitat occupied by this pretty plant is the sandy footslope of the San Rafael Swell and Henry Mountains in eastern Emery, Wayne, and Garfield counties. Recently, it has been found along the dip-slopes of the Curtis formation near the western margin of the San Rafael Swell. The total length of the area occupied is more than 100 miles long.

Astragalus serpens.—The plateau milkvetch is a handsome plant, long known from the type locality at Loa Pass in western Wayne County. It is a plant of the low sagebrush community on volcanic gravels. Recently it has been found in Piute, Garfield, and Iron counties. The populations, while disjunct, consist of few to very many individuals, which wax and wane with local conditions of weather. The area occupied is very large.

Cryptantha breviflora.—The Uinta Basin cryptantha occurs from the west central portion of the basin eastward through central Uintah County, and into the southeastern tip of Daggett County. It is one of the common species of the Uinta Basin.

Hermitudium alipes var. pallidum.—Recent collections from the Uinta Basin indicate a broad range for the pale hermitudium. It is at least common, and even locally abundant, in much of its range in lower elevation portions of Duchesne and Uintah counties.

Parthenium ligulatum.—This caespitose composite is known from the Green River Shale of both Duchesne and Uintah counties, and from the Carmel and Dakota formations in the San Rafael Swell in Emery County. It remains obscure, but hardly rare.

Physaria grahamii.—This plant has been one of the enigmatic species of the state. Collected by Graham in the 1930s, and named by C. V. Morton during that period, the entity was thought to be extinct when first listed in the Federal Register. It is now known rather widely from the escarpments of the Tavaputs, West Tavaputs, and other western plateaus in Carbon, Emery, Duchesne, and Uintah counties. Additionally, it occurs in west central Colorado.

Upgraded Species

There are two plant species which were cited as threatened on the Federal Register list of 1975, but which appear to have the limited range and potential for extinction of endangered plants. Therefore, it is proposed that they be upgraded to that status. Included in this category are the following (see Table 2):

Astragalus callithrix.—This obscure species is known from only a few localities throughout its range in Millard County, Utah, and Nye County, Nevada. The loss of any population might be sufficiently destructive that the species would be lost.

Cryptantha barnesii.—The total area known to be occupied by this entity is apparently smaller than that in published maps of the distribution. The plant is a Green River Shale endemic and could be eradicated through exploitation of that material for its oil.

Threatened Plant Lists and Proposed Modifications

Threatened plants as currently constituted are listed in Table 2. The present list consists of some 85 taxa but includes many taxa now recognized as being common. These were previously poorly known entities, which have been updated by contemporary collections. Because of the accumulated information, it is proposed that some 30 species be removed from the list of threatened Utah plants. Most of those proposed to be delisted have such broad ranges that they could be threatened only by the most widespread destruction of habitat, or by some specific and selective destructive force. Plants which should be delisted include:

Astragalus convallarius var. finitimus.—There are a series of populations of this plant extending through northern Washington County, western Iron County, and adjacent Nevada. This plant is not rare; its interpretation has been obscure.

Astragalus ensiformis.—When expanded to include the materials known as A. min-
Table 2. Current list of threatened plants cited in Federal Register publications (1975, 1976), their locality by county in Utah, and recommendations of status based on present data.

<table>
<thead>
<tr>
<th>Threatened Plants</th>
<th>Locality</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Arabis demissa</em> Greene</td>
<td>Daggett</td>
<td>no change</td>
</tr>
<tr>
<td>var. <em>lanugosa</em> Rollins</td>
<td>Daggett, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td>var. <em>russeola</em> Rollins</td>
<td>Grand, San Juan</td>
<td>no change</td>
</tr>
<tr>
<td><em>Asclepias curta</em> Woodson</td>
<td>Emery, Grand, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Asclepias ruthiae</em> Maguire &amp; Woodson</td>
<td>Kane, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus amplerarius</em> S. Wats.</td>
<td>Garfield, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus barnebyi</em> Welsh &amp; Atwood</td>
<td>Millard</td>
<td>upgrade to E</td>
</tr>
<tr>
<td><em>Astragalus callithrix</em> Barneby</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus chiaotes</em> Barneby</td>
<td>Iron, Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Astragalus conciliarius</em> greene</td>
<td>San Juan</td>
<td>no change</td>
</tr>
<tr>
<td>var. <em>finiimosa</em> Barneby</td>
<td>Duchesne, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus cochana</em> M. E. Jones</td>
<td>Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Astragalus duchesnensis</em> M.E. Jones</td>
<td>Kane, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus ensiforina</em> M.E. Jones</td>
<td>Beaver, Iron</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Astragalus lanceatius</em> A. Gray</td>
<td>Emery</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus oophorus</em> S. Wats.</td>
<td>Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td>var. <em>loenocaryx</em> Barneby</td>
<td>Beaver, Piute</td>
<td>no change</td>
</tr>
<tr>
<td><em>Astragalus rafaelensis</em> M. E. Jones</td>
<td>Carbon, Duchesne, Emery</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Camissonia parryi</em> (S. Wats.) Raven</td>
<td>Grand, Garfield, Kane</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Castilleja parvula</em> Rydb.</td>
<td>San Juan, Sevier, Uintah, Wayne, Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Castilleja scabrida</em> Eastw.</td>
<td>Salt Lake, Utah, Wasatch, Weber</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Corydalis caseana</em> A. Gray</td>
<td>Uintah</td>
<td>upgrade to E</td>
</tr>
<tr>
<td><em>Cryptantha barnebyi</em> Johnst.</td>
<td>Millard</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cryptantha compacta</em> Higgins</td>
<td>Grand</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cryptantha elata</em> (Eastw.) Payson</td>
<td>Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cryptantha semiglabra</em> Barneby</td>
<td>Daggett, Summit, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cryptantha stricta</em> (Osterh.) Payson</td>
<td>Millard</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Cymopterus basalticus</em> M.E. Jones</td>
<td>Juab, Sevier, Utah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cymopterus coulteri</em> (M.E. Jones) Mathias</td>
<td>Duchesne, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cymopterus duchesnensis</em> M.E. Jones</td>
<td>Garfield, Grand, Kane, Millard, San Juan, Uintah, Washington, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cymopterus newberryi</em> (S. Wats.) M.E. Jones</td>
<td>Iron, Sanpete, Sevier, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Cymopterus rosei</em> M.E. Jones</td>
<td>Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Draba aspella</em> Greene</td>
<td>Garfield, Pinte</td>
<td>no change</td>
</tr>
<tr>
<td>var. <em>zonensis</em> (C.L. Hitchc.) Welsh &amp; Reveal</td>
<td>Garfield, Iron, Kane</td>
<td>no change</td>
</tr>
<tr>
<td><em>Draba sobolifera</em> Rydb.</td>
<td>Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Draba subalpina</em> Goodman &amp; Hitchc.</td>
<td>Garfield, Kane, San Juan</td>
<td>no change</td>
</tr>
<tr>
<td><em>Epilobium nevadense</em> Munz</td>
<td>Cache</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum abajoensis</em> Cronq.</td>
<td>Box Elder, Salt Lake, Utah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum cronquistii</em> Maguire</td>
<td>Grand, San Juan</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum garrettii</em> A. Nels.</td>
<td>San Juan</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum marcus</em> Rydb.</td>
<td>Millard</td>
<td>no change</td>
</tr>
<tr>
<td>Threatened Plants</td>
<td>Locality</td>
<td>Recommendations</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td><em>Eriogonum janesii</em> Benth. var. <em>rupicola</em></td>
<td>Kane, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum nanum</em> Reveal</td>
<td>Box Elder, Weber</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum ostlundii</em> M.E. Jones</td>
<td>Pinte, Sevier</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum paiguicruce</em> (M.E. Jones) Reveal var. <em>alpestre</em> (Stokes) Reveal</td>
<td>Iron</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum saurium</em> Reveal</td>
<td>Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum thompsonae</em> S. Wats. var. <em>albisflorum</em> Reveal</td>
<td>Kane, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Eriogonum viridulum</em> Reveal</td>
<td>Duchesne, Uintah</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Euphorbia nephradenia</em> Barneby</td>
<td>Emery, Kane, Wayne</td>
<td>no change</td>
</tr>
<tr>
<td><em>Geranium marginale</em> Rydb.</td>
<td>Garfield, Iron, Sevier, Wayne</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Gilia mcvickerae</em> M.E. Jones</td>
<td>Garfield, Iron, Pinte, Sevier, Uintah</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Haplopappus scopulorum</em> (M.E. Jones) Blake</td>
<td>Iron, Kane, San Juan</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Hymenopappus filifolius</em> Hook. var. <em>tomentosus</em> (Rydb.) Turner</td>
<td>Kane, Washington</td>
<td>no change</td>
</tr>
<tr>
<td><em>Lesquerella garrettii</em> Payson</td>
<td>Salt Lake, Utah, Wasatch</td>
<td>no change</td>
</tr>
<tr>
<td><em>Lesquerella rubicundula</em> Rollins</td>
<td>Garfield, Kane, Piute</td>
<td>no change</td>
</tr>
<tr>
<td><em>Lomatium minimum</em> Mathias</td>
<td>Garfield, Iron, Kane</td>
<td>no change</td>
</tr>
<tr>
<td><em>Lupinus marianus</em> Rydb.</td>
<td>Garfield, Piute, Sevier</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Macraeranthera grindelioides</em> (Nutt.) Shiners var. <em>depressa</em> (Maguire) croq. &amp; Keck</td>
<td>Beaver, Millard</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Mertensia viridis</em> A. Nels. var. <em>cana</em> (Rydb.) L.O. Williams</td>
<td>Summit</td>
<td>no change</td>
</tr>
<tr>
<td><em>Mertensia viridis</em> A. Nels. var. <em>dilata</em> (A. Nels.) L.O. Williams</td>
<td>Daggett</td>
<td>no change</td>
</tr>
<tr>
<td><em>Nama retrorsum</em> J.T. Howell</td>
<td>Garfield, Grand, Kane</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Opuntia whipplei</em> Engelm. &amp; Bigel. var. <em>multigeniculata</em> L. Benson</td>
<td>Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Parrya rydbergii</em> Botsch.</td>
<td>Daggett, Duchesne, Summit, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon abietinus</em> Pennell</td>
<td>Iron, Sevier, Utah</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Penstemon acaulds</em> L.O. Williams</td>
<td>Daggett</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon caespitosus</em> Nutt. var. <em>suffructicosus</em> A. Gray</td>
<td>Beaver, Garfield, Piute</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Penstemon compactus</em> (Keck) Crosswhite</td>
<td>Cache</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon leiophyllus</em> Pennell</td>
<td>Garfield, Iron, Kane, Sevier, Washington</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Penstemon parvis</em> Pennell</td>
<td>Garfield, Piute, Uintah</td>
<td>no change</td>
</tr>
<tr>
<td><em>Penstemon nintahensis</em> Pennell</td>
<td>Daggett, Duchesne, Uintah</td>
<td>remove from list</td>
</tr>
<tr>
<td><em>Penstemon wardii</em> A. Gray</td>
<td>Sanpete, Sevier</td>
<td>no change</td>
</tr>
<tr>
<td><em>Peteria thompsonae</em> A. Gray</td>
<td>Emery, Grand, Juab, Kane, San Juan, Washington</td>
<td>remove from list</td>
</tr>
</tbody>
</table>
thorniae var. gracilior, the species becomes rather broadly distributed in a series of interconnected populations, which are hardly threatened.

**Astragalus oorphorus** var. lonicocalyx.—Previously known from only a single locality in western Iron County, the taxon is now known from several localities in Iron, and in Beaver County also. Additionally, the species is locally common in Lincoln County, Nevada.

**Castilleja scabrida**.—This species was placed on the list by oversight. It is a widely distributed paintbrush, flowering early in the growing season, and rivaling *C. chromosa* in abundance.

**Camissonia parryi**.—This plant has a restricted distribution, occurring only in Washington County, Utah. It is hardly rare, however. When the water regimen is conducive, this species grows in great abundance.

**Corydalis caseana**.—The distribution of this taxon indicates that it is rather widespread, although only locally common. It is not known to be threatened at the present time.

**Cymopterus basalticus**.—While the range of this species is known from Millard County only, that county is one of the largest in Utah. And, *C. basalticus* is broadly distributed in the western portion of that county. Indeed, the plants are common to abundant in much of the region.

**Cymopterus newberryi**.—This is another example of a plant which should not have been placed on the list. The broad range of this common plant has been known for many years.

**Cymopterus rosei**.—The plant remains rather obscure, but even fragmentary records demonstrate an extensive range for the entity.

**Erigeron garrettii**.—The Garrett fleabane daisy has a wide area of distribution in the northern and central Wasatch Range.

**Eriogonum viridulum**.—The range of *E. viridulum* is known to extend for more than 100 miles across the east-west axis of the Uinta Basin.
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Geranium marginale.—The plateau geranium is a common plant over a broad section of south central Utah.

Gilia mcvickerae.—While occurring in disjunct populations, often on peculiar soils (either modified volcanics or calcareous gravels), the current knowledge indicates that the plants are widespread.

Haploappus scopulorum.—A plant of protected coves in sandstone, this species has a broad range which defies classification as threatened.

Lupinus marianus.—This represents a portion of the variation within L. sericeus, with which it grades. The distribution of L. marianus in its narrowest sense is known to be more than 60 miles in length.

Machaeranthera grindelioides var. depressa.—This plant is widespread on knolls and ridges in western Millard, Tooele, and Beaver counties, where it is locally common to abundant.

Nama retrorsum.—The distribution of N. retrorsum precludes classification as threatened.

Opuntia whipplei var. multigeniculata.—This is a taxonomically questionable and obscure unit. The plants should be removed from the threatened category pending additional research.

Penstemon abietinus.—Large populations of this taxon are present within its rather broad range.

Penstemon caespitosus var. suffruticosus.—The populations of this entity, which has a rather broad distribution on volcanic gravels, seem to be enhanced by disturbance, either natural or artificial. Hence, roadcuts and slide areas support viable stands of this pioneer plant.

Penstemon leiophyllus.—Collections of P. leiophyllus are so numerous and from such a broad area, that one has difficulty in ascertaining how it could be threatened.

Peteria thompsonae.—An unusual and interesting plant of broad distribution, this plant is locally common or even abundant. There is no reason to list it as threatened.

Phacelia constanceei.—Known from divers populations over much of southern Utah, there seems to be little justification for keeping this handsome plant on the list.

Phacelia demissa var. heterotricha.—Though disjunct, this variety does not seem to be threatened in any portion of its range.

Phacelia rafaelensis.—The problem of range is the same as with P. constanceei. It is too broadly distributed to be treated as threatened.

Phlox grahamii.—The type, and only known collection of P. grahamii, is a taxonomic specimen of what is presumed to be P. longifolia. Aecial sori of a rust are evident on the leaves and stem of the specimen, and distortion of vegetative and floral parts are in keeping with that observed in other diseased plants.

Phlox jonesii.—The type of P. jonesii appears to represent little more than a shade form of P. austromontana, and certainly belongs within the limits of that species.

Primula specuicola.—While of great interest from a phytogeographical sense, P. specuicola is found in too many sites to be classed as threatened. This is true even though one stronghold of the species has been eradicated by the rising waters of Lake Powell. The plant has almost an identical distribution as that of Minnulius eastwoodiae.

Puccinellia parishii.—There is no evidence to support the presence of this entity in Utah.

Sceletocactus spinosior.—Indications of the relationship of this plant with S. whipplei, in a broad sense, require a reevaluation of this entity which, though somewhat obscure, seems to be rather broadly distributed.

Candidate Endangered Species

There are four taxa which require consideration as endangered species. Of these, only one was known at the time when initial lists were prepared (Table 3). That one, Lesquerella tumulosa, had been placed into synonymy with a related species, L. rubicundula. In the judgment of this writer, L. tumulosa is distinct morphologically, spatially, and substrate-wise from L. rubicundula. The two plants are separated by about 900 meters in elevation. They flower at different times, with the low elevation L. tumulosa completing flowering at about the time L. rubicundula begins. Lesquerella
Endangered Plants (Proposed) | Locality | Justification
---|---|---
*Astragalus montii* Welsh | Sanpete | Local; restricted to limestone; high elevation
*Eriogonum corymbosum* Beath, var. *Matthewsiae* Reveal | Washington | Local; restricted to mud-siltstone; low elevation
*Lesquerella tumulosa* (Barneby) Reveal | Kane | Local; restricted to limy mudstone; low elevation
*Thelypodiopsis argillacea* Welsh & Atwood | Uintah | Local; restricted to oil shale; moderate elevation

*Eriogonum corymbosum* is known from white calcareous shales of the Winsor member of the Carmel Formation, and *L. rubicundula* occurs on the Wasatch limestone sequence. Further, the pluricipital, pulvinate growth with a great many inflorescences per plant is not known for *L. rubicuncula*, but is characteristic of the population of *L. tumulosa*.

The remaining candidate endangered species are all newly described or undescribed. They are as follows:

*Astragalus montii* Welsh sp. nov.—*Astragalus limnochari* Barneby aemulans differ in floribus magnioribus et purpureis et foliis non ciliatis. Plantae perennes, acaulescentes, 1–5 cm altae, caudicibus ramificantibus ensescentibus; pubescentiae basissiae; stipulae 2–4 mm longae totus connatae-vaginantes; foliola 1.3–4.8 cm longa: foliola 5–13, 2–8 mm longa 1–2 mm lata lanceolata oblonga vel elliptica strigosa infra non ciliata ad marginem glabra supra; pedunculi 0.8–4.5 cm longi in fructum reclinatum; racem 2–to 8-floribus, floribus ascendentibus vel patentibus ad anthesin, axibus 0.2–0.5 cm longis in fructum; bracteae 1–3 mm longae; pedicelli 0.8–1.4 mm longi; bracteolae nul- lae; calyx 3.3–4 mm longus, tubo 2.2–2.5 mm longo campanulato strigosus, dentibus 0.6–1.5 mm longis triangularibus vel sub- ulatis; flores 7.2–8 mm longi purpureae, ala apicis albis; legumina patentia sessilia ovoidea vesicaria 11–18 mm longa 8–12 mm lata maculosa uniloculari; ovula 10. Holotype: Utah, Sanpete Co., ca 17 miles due west of Ferron, Flagstaff Limestone, marly barrens, at 3,350 m, S. L. & Jean Welsh 15404, 13 July 1977 (BRY, isotopes to be distributed). Paratypes: Utah, Sanpete Co., M. E. Lewis 4312, 23 July 1976; do, M. E. Lewis 4775, June 1977 (both at BRY).

*Astragalus montii* is a near congener of *A. limnochari* from which it is isolated geographically by some 225 km. Both are low-growing calciphiles occurring on limestone gravels at high elevations. They agree further in general aspect and in having small flowers giving rise to bladdery-inflated unilocular pods. The flowers differ in color, and those of *A. montii* average larger in size. The striking long hair which margin the leaves of *A. limnochari* are lacking in *A. montii*. The species is named to honor Mont E. Lewis, extraordinary plant collector, and codiscoverer of the plant along with Robert Thompson.

*Eriogonum corymbosum* var. *matthewsiae*.—The only known population of this buckwheat variety occurs at the mouth of Zion Canyon on the Chiricau Formation. Roadways, power lines, and other developments on the slope where the plants occur threaten its existence. Certainly, this plant has the characteristics of an endangered species.

*Thelypodiopsis argillacea*.—The Green River Shale formation serves as substrate for many unusual species of plants. Thus, it is not unexpected that still another narrow endemic be located on that formation. The species was located while searching for *Glaucocarpum suffrutescens*, another rare plant of Green River Shale. Subsequent investigation of the type area indicated that
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T. argillacea is narrowly restricted. The small population is known at present from a single north-facing slope. Based on that information, and given the potential for development of oil shale, T. argillacea has the features of an endangered plant.

Candidate Threatened Species

There are several species and varieties of very limited distribution which were overlooked or unnamed at the time when the original lists of species were proposed as threatened. The candidates for inclusion on the threatened list for Utah is presented in Table 4. Justification for inclusion is presented below.

Table 4. Candidate threatened species not currently on Federal Register lists (1975, 1976), their locality by county in Utah, and justification based on present data.

<table>
<thead>
<tr>
<th>Threatened Plants (Proposed)</th>
<th>Locality</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astragalus castaneiformis var. consobrinus. — This is an obscure tiny plant of volcanic gravels with its main locus in Rabbit Valley, Wayne Co., where it is only locally common. Further materials might dictate its removal from the list.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astragalus henrimontanensis (Welsh, nom. nov. based on Astragalus stocksii Welsh Great Basin Nat. 34:307. 1974.— The Dana milkvetch is known from the Henry Mountains only. It is restricted to an elevational range corresponding to the ponderosa pine belt in the Penellen Pass vicinity. Total extent of the population based on current information is through approximately six miles of the eastern flank of Mount Pen nell. Development of any kind, including</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threatened Plants (Proposed)</th>
<th>Locality</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astragalus castaneiformis S. Wats. var. consobrinus Barneby</td>
<td>Garfield, Piute, Sevier, Wayne</td>
<td>Local; volcanic gravel</td>
</tr>
<tr>
<td>Astragalus limnocharis Barneby</td>
<td>Iron, Kane</td>
<td>Local; calciphile; high elevation</td>
</tr>
<tr>
<td>Astragalus henrimontanensis Welsh</td>
<td>Garfield</td>
<td>local; montane endemic</td>
</tr>
<tr>
<td>Astragalus monumentalis Barneby</td>
<td>Garfield, San Juan</td>
<td>Local; Cedar Mesa Sandstone endemic</td>
</tr>
<tr>
<td>Astragalus sabulosus M.E. Jones</td>
<td>Grand</td>
<td>Local; Mancos Shale endemic</td>
</tr>
<tr>
<td>Cymopterus higginsii Welsh</td>
<td>Kane</td>
<td>Local; Tropic Shale endemic</td>
</tr>
<tr>
<td>Dalea epica Welsh</td>
<td>San Juan</td>
<td>Local; Navajo Sandstone endemic</td>
</tr>
<tr>
<td>Draba maguirei C.L. Hitchc.</td>
<td>Cache, Weber</td>
<td>Local; montane endemic</td>
</tr>
<tr>
<td>Erionymus natum Reveal</td>
<td>Millard</td>
<td>Local; lacustrine terrace endemic</td>
</tr>
<tr>
<td>Gaillardia flava Rydb.</td>
<td>Grand, Emery</td>
<td>Local; Mancos Shale endemic</td>
</tr>
<tr>
<td>Hedysarum boreale Nutt. var. gremiale (Rollins) Northstrom &amp; Welsh</td>
<td>Uintah</td>
<td>Local; Bishop Conglomerate endemic</td>
</tr>
<tr>
<td>Helianthus deserticola Heiser</td>
<td>Washington</td>
<td>Local; sand dune endemic</td>
</tr>
<tr>
<td>Hympnoxys depressa (Torr. &amp; Gray) Welsh &amp; Reveal</td>
<td>Emery, Garfield, Uintah (?)</td>
<td>Local; Silicicous conglomerate, very restricted</td>
</tr>
<tr>
<td>Lepidium montanum Nutt. var. neesiae Welsh &amp; Reveal var. stellae Welsh &amp; Reveal</td>
<td>Garfield</td>
<td>Local; Navajo Sandstone endemic</td>
</tr>
<tr>
<td>Lomatium latilobum (Rydb.) Mathias</td>
<td>Kane</td>
<td>Local; Windsor endemic</td>
</tr>
<tr>
<td>Lupinus jonesii Rydb.</td>
<td>Grand, San Juan</td>
<td>Local; Entrada Sandstone endemic</td>
</tr>
<tr>
<td>Machaeranthera glabriuscula (Nutt.) Cronq. &amp; Keck var. conferifolia Cronq.</td>
<td>Washington</td>
<td>Local; sandstone and alluvial endemic</td>
</tr>
<tr>
<td>Machaeranthera kingii (D.C. Eaton) Cronq. &amp; Keck</td>
<td>Garfield, Kane</td>
<td>Local; Kainipowits Endemic</td>
</tr>
<tr>
<td></td>
<td>Cache, Salt Lake, Utah</td>
<td>Disjunct, local; calciphile</td>
</tr>
</tbody>
</table>
reclamation of lands in range improvement attempts, could result in loss of substantial portions of the population.

**Astragalus limnocharis.**— The Navajo Lake milkvetch is known mainly from the gravelly shore of the lake. Dispersal of the bladdery pods is apparently by wind and by water. The plants tend to occur in rows along minor wave-cut terraces in the beach. A dam extends across the lake basin, limiting the water to the west end of the lake, except in peak years. The milkvetch species does not now occur in the portion of the basin from which the lake has been excluded. A secondary location has been reported in the Cedar Breaks vicinity, a short distance to the northwest of the Navajo Lake locus.

**Astragalus monumentalis.**— The Monument milkvetch is known from Natural Bridges National Monument westward along the Cedar Mesa Sandstone to where that formation dips beneath other strata west of the Colorado River Canyon in easternmost Garfield County, and north to the Chesler Park region of Canyonlands National Park. Any development on that formation could result in loss of portions of the total population, and require change of status to endangered.

**Astragalus sabulosus.**— This plant is known only from the vicinity of Thompson east to Cisco, and possibly south as far as the banks of the Colorado River in that general vicinity. All modern collections are from Mancos Shale, but early collections by Jones presumably came from Morrison or Cedar Mountain formations near the river. Even in optimum seasons of growth for this handsome large-flowered selenophyte the number of plants in the known populations is small. Only a few dozen plants have ever been observed by the writer in several years of observation. The plant has very large ochroleucous flowers which distinguish this plant easily from the similar *A. praelongus*, with which it grows. The entire known
range of the species is in northcentral Grand County.

*Atriplex welshii.*—The Welsh saltbush is a local species of the Mancos Shale a few miles southwest of Cisco in Grand County. It is a restricted plant of the Mancos Shale, in a region where few plants occur on the formation. Other local species are known from the vicinity, and perhaps the entire range of the species should be considered for preservation.

*Cymopterus higginsii.*—A plant with lavender flowers, *C. higginsii,* is known from the Tropic Shale (Tumunk equivalent) from the vicinity of Coyote Creek east to Smoky Mountain in eastern Kane County. The area is being subjected to heavy use by off-highway vehicles, and other anticipated activities along with that use might jeopardize portions of the plant, which is only locally common in the region.

*Dalea epica.*—The Hole-in-the-Rock prairie clover is known from a small population on Navajo Sandstone some distance east of Halls Crossing in San Juan County. The population has been interpreted by R. C. Barneby (personal communication) as a portion of *D. flavescens,* to which it is undoubtedly closely allied. The population deserves preservation, even if it is only an exclusive phase within the total variation of that species. The taxon is recognized at species level by Welsh (1977) in a treatment of the legumes of Utah, which is in preparation.

*Draba maguirei.*—This entity, in a broad sense, is very restricted to mountain summits in a small portion of the northern Wasatch Range.

*Eriogonum natum.*—This wild buckwheat is a narrow endemic of Lake Bonneville lacustrine deposits in Millard County. The total known area of the population is very small. It is worthy of being regarded as threatened.

*Gaillardia flava.*—A smelly, resinous plant of canyon bottoms in portions of the Mancos Shale, this handsome yellow blanket-flower has long remained obscure. Total range is over a region only about 20 miles in length.

*Hedysarum boreale var. gremiale.*—An unusual phase of *H. boreale* with spinulose projections along the reticulations of the fruit, this plant occurs in west central Uintah County. The plants apparently grade with the more typical *H. boreale* materials in the region. However, this is the only known taxon of American *Hedysarum* species with spinulose projections. The population is poorly known, and further work is needed to elucidate the total area involved.

*Helianthus deserticolus.*—This sand-inhabiting sunflower is known to occur in a limited low-elevation portion of Washington County. More information is necessary to understand the total limits of the taxon and to clarify its relationship to *H. anomalus* Blake.

*Hymenoxys depressa.*—Although first named by Gray (1849), this plant has remained obscure. The type was taken by Fremont on his second expedition, possibly in the Uinta Basin of Utah.

*Lepidium montanum var. neeseae.*—This tiny phase of the polymorphic *L. montanum* is known from high elevations on Navajo Sandstone only.

*Lepidium montanum var. stellae.*—The Stella *Lepidium* grows with *Lesquerella tumulosa* on the Winsor formation in western Kane County.

*Lomatium latilobum.*—The broad-lobed biscuitroot is a narrow endemic of sandy soils, usually at the base of monoliths in Entrada Sandstone in south central Grand and north central San Juan counties. The species is only locally common. Development of those regions might cause the species to become endangered.

*Lupinus jonesii.*—The Jones lupine inhabits sandy and calcareous soils of central and western Washington County. The species has long remained obscure, and much more information should be gathered prior to final disposition of this taxon.

*Machaeranthera glabriuscula var. confertifolia.*—The total area occupied by this handsome white-flowered daisy is confined to the gray colluvial and in situ soils of the Kaiparowits formation. The plants grow on crests and eroded flats of that formation, generally within the juniper-pinyon woodland. The formation is local in the northern portion of the Kaiparowits Plateau vicinity,
and it might be endangered by proposed and future developments.

Machaeranthera kingii.—Much more information is required to assess the total range of *M. kingii*, but indications are that the plant is restricted to limestone outcrops in the mountains of Cache, Salt Lake, and Utah counties. Collections and known localities of the plant are few.

*Mentzelia argillacea.*—The clay blazing star is restricted to Arapieen Shale and alluvium derived from that formation and others adjacent to it. Total area is apparently from near Monroe on the south to Salina on the north. Mining for gypsum and other minerals shrinks the area occupied by this distinctive plant each year.

*Musineon lineare.*—This species is known from a localized portion of Cache County, which is being imposed by construction and other activities.

*Najas caespitosa.*—Fish Lake is the only known habitat of this aquatic plant. The relationship apparently lies with more widespread species in the genus. Until the relationship is clarified, it is best to consider these unusual plants as threatened.

*Penstemon atwoodii.*—The Atwood beardtongue has a similar but smaller range than *Astragalus malacoides*. Both are confined to the Straight Cliffs and associated formations on the Kaiparowits Plateau and vicinity. Prospective development of resources in the Kaiparowits could result in eradication of portions of the population and might lead to endangered classification.

*Penstemon humilis* var. *obtusifolius.*—Confined to Navajo sandstone and alluvium derived from that formation, this remarkably low beardtongue is known only from eastern Washington County.

*Penstemon tidestromii.*—Long obscure, the Tidestrom beardtongue is known only from the Sanpitch Mountains in eastern Juab and Sanpete counties.

*Psoralea pariensis.*—The few known populations of the Paria scurpfeal occur on Wasatch Limestone and alluvium derived from the formation, or less commonly on sandstone and sandy alluvium. Many more collections might indicate a rather broader range and require a reevaluation of the threatened status.

_Silene petersonii._ var. _minor._—Endemic to limestone members of the Wasatch Formation, this variety of the striking _S. petersonii_ is known from small populations located in two main areas. The type locality is at Red Canyon in Garfield County, and the other main locus is at Cedar Breaks.

_Sphaeralcea caespitosa._—The Jones globe mallow has a similar area of occupation as does _Penstemon concinnus_ and _P. nanus_, but it does not always occur with those species. Portions of western Millard and Beaver counties not inundated by Lake Bonneville seem to be the primary areas occupied by this beautiful plant.

_Telphium agitatum_ var. _ovalifolium._—This peculiar plant is known from the vicinity of Panguitch Lake in western Garfield and adjacent Iron counties. The populations are poorly known, indicating a need for much additional information.

_Townsendia mensana._—The range of _T. mensana_ is only generally known. The status of the species should be indicated as threatened until such a time that this entity is demonstrated to be more common than currently indicated.

_Townsendia minima._—The least _townsendia_ is known from the white and pink limestone members of the Wasatch Formation. Usually, the plants occur in narrow bandlike strips along the margin of breaks and ridge tops on the formation.

**Distribution by County**

Federal agencies and others interested in development of lands in Utah require information on proposed endangered and threatened plant distribution so that decisions on land use can be made. The summary lists presented below will allow interested parties to determine whether more specific investigations will be necessary. The lists reflect the recommended changes indicated in the present paper.

**Beaver County**
- Castilleja parvula (T)
- Penstemon concinnus (T)
- Penstemon nanus (T)
- Sclerocactus pubispinus (T)
- _Sphaeralcea caespitosa_ (T)

**Box Elder County**
- Allium passeyi (E)
Eriogonum nanum (T)
Sclerocactus pubispinus (T)

CACHE COUNTY
Draba maguirei (T)
Erigeron cronquistii (T)
Eriogonum loganum (E)
Machaeranthera kingii (T)
Musineon lineare (T)
Penstemon compactus (T)
Primula maguirei (T)

CARBON COUNTY
Eriogonum corymbosum var. davidseii (E)
Eriogonum lancifolium (E)
Lygodesmia grandiflora var. stricta (E)

DAGGERT COUNTY
Arabis demissa var. lanugida (T)
var. russeliana (T)
Cryptantha stricta (T)
Mertensia viridis var. dilatata (T)
Parrya rydbergii (T)
Penstemon acaulis (T)
Penstemon uintahensis (T)

DUCHESNE COUNTY
Astragalus dtritis (T)
Astragalus duchesnensis (T)
Cymopterus duchesnensis (E)
Eriogonum hylophilum (E)
Lepidium barnebyanum (E)
Parrya rydbergii (T)
Penstemon garrettii ? (E)
Sclerocactus glaucus (E)
Townsendia mensana (T)

EMERY COUNTY
Asclepias ruthiae (T)
Astragalus rafaelensis (T)
Cryptantha jonesiana (T)
Cryptantha johnstonii (E)
Erigeron maguirei (E)
Eriogonum intermontanum (E)
Eriogonum smithii (E)
Euphorbia nphradenia (T)
Festuca dasyclada ? (PoEx)
Guillardia flava (T)
Hymenoxys depressa (T)
Sclerocactus wrightiae (E)

GARFIELD COUNTY
Astragalus barnbyi (T)
Astragalus castaneiformis var. consobrinus (T)
Astragalus hentrimontanensis (T)
Astragalus malacoides (T)
Astragalus monumentalis (T)
Astragalus perians (T)
Castilleja aquariensis (E)
Castilleja realii (E)
Cryptantha ochroleuca (E)
Eriogonum abajoensis (T)
Eriogonum aretioides (E)
Eriogonum corymbosum var. revealanum (T)
Eriogonum cronquistii (E)
Draba sobolifera (T)
Draba subalpina (T)
Heterotheca jonesii (E)
Hymenoxys depressa (T)
Lepidium montanum var. neesae (T)
Lesquerella rubicundula (T)
Lomatium minimum (T)
Machaeranthera glabrissucula var. confertiflora (T)
Penstemon atwoodii (T)
Penstemon bracteatus (T)
Penstemon parvus (T)
Phlox gladiformis (T)
Psoralea paliensis (T)
Silene petersonii var. minor (T)
Ranunculus aceriformis var. aestivalis (PoEx)
Thelypodium sagitatum var. ovalifolium (T)
Townsendia minima (T)

GRAND COUNTY
Asclepias cutleri (T)
Asclepias ruthiae (T)
Astragalus iselyi (E)
Astragalus sabulosus (T)
Atriplex welsbii (T)
Cryptantha elata (T)
Cyclademia humilis var. jonesii (E)
Eriogonum mancus (T)
Gaillardia flava (T)
Lomatium latilebnum (T)
Phacelia howelliana (T)

IRON COUNTY
Astragalus lentigenosus var. ursinus ? (PoEx)
Astragalus limnocharis (T)
Cymopterus minus (E)
Draba subalpina (T)
Eriogonum flagellaris var. trilobatus (E)
Eriogonum panguiense var. alpestre (T)
Lomatium minimum (T)
Phlox gladiformis (T)
Silene petersonii var. minor (T)
Thelypodium sagittatum var. ovalifolium (T)

JUAB COUNTY
Cymopterus coulteri (T)
Penstemon tidestromii (T)

KANE COUNTY
Astragalus ampullarius (T)
Astragalus lancearius (T)
Astragalus limocharis (T)
Cymopterus higginsi (T)
Draba subalpina (T)
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Erigeron abajoensis (T)
Erigeron religiosus (E)
Eriogonum jamesii
var. rupicola (T)
Eriogonum thompsonae
var. thompsonae (T)
Euphorbia niphobractenia (T)
Hymenopappus filifolius
var. tonentosus (T)
Lepidium montanum
var. stellae (T)
Lesquerella rubicundula (T)
Lesquerella tumulosa (E)
Lomatium minimum (T)
Machaeranthera glabriuscula
var. confertiflora (T)
Penstemon atwoodii (T)
Phacelia capilosa (T)
Phacelia mammillariensis (E)
Psoralea epipsila (E)
Psoralea parrisii (T)
Townsendia minima (T)
Vigniera soliceps (E)
Zigadenus vaginatus (T)

Millard County
Astragalus callithrix (E)
Cryptantha compacta (T)
Cuscuta warneri (PoEx)
Eriogonum ammophilum (E)
Eriogonum eremicum (T)
Eriogonum intermontanum (E)
Eriogonum saurinum (T)
Eriogonum ostlundii (T)
Penstemon concinnus (T)
Penstemon nanus (T)
Penstemon parvus (T)
Sclerocactus pubispinus (T)

Piute County
Astragalus castaneifolius
Astragalus perianus (E)
Eriogonum corymbosum
var. realLEANum (T)
Castilleja parvula (T)
Draba sobolifera (T)
Eriogonum ostlundii (T)
Lesquerella rubicundula (T)

Salt Lake County
Lesquerella garrettii (T)
Machaeranthera kingii (T)

San Juan County
Asclepias cutleri (T)
Astragalus cottamii (T)
Astragalus cronicitii (E)
Astragalus iselyi (E)
Astragalus monumentalis (T)
Dalea epica (T)
Erigeron abajoensis (T)
Erigeron kachinensis (E)
Erigeron manceus (T)
Eriogonum clavellatum (T)
Eriogonum humifugans (E)
Lomatium latilobum (T)
Phacelia howelliana (T)
Phacelia indecora (E)

Sanpete County
Astragalus desereticus (PoEx)
Astragalus montii (E)
Festuca dasyclada (PoEx)
Penstemon tideslomii (T)
Penstemon wardii (T)
Phacelia utahensis (T)
Silene petersonii
var. petersonii (T)

Sevier County
Astragalus castaneifolius
var. consobrinus (T)
Cymopterus coulteri (T)
Eriogonum ostlundii (T)
Mentzelia argillacea (T)
Najas caespitosa (T)
Penstemon wardii (T)
Phacelia utahensis (T)
Sclerocactus pubispinus (T)
Townsendia aprica (E)

Summit County
Cryptantha stricta (T)
Mertensia viridis
var. cana (T)
Parrya rydbergii (T)

Uintah County
Arabis demissa
var. russeola (T)
Astragalus detritalis (T)
Astragalus duchesnensis (T)
Astragalus hamiltonii (T)
Astragalus lutosus (E)
Astragalus saurinus (T)
Cryptantha barnebyi (E)
Cryptantha grahamii (E)
Cryptantha stricta (T)
Eriogonum saurinum (T)
Eriogonum intermontanum (E)
Eriogonum saurinum (T)
Glaucocarpum suffrutescens (E)
Hedysarum boreale
var. gremiale (T)
Hymenoxys depressa (T)
Lepidium barneyanum (T)
Parrya rydbergii (T)
Penstemon grahamii (E)
Penstemon utahensis (T)
Sclerocactus glaucus (E)
Thelypodopsis argillacea (E)
Townsendia mensana (T)

Utah County
Cymopterus coulteri (T)
Lesquerella garrettii (T)
Machaeranthera kingii (T)
Phacelia argillacea (E)

Wasatch County
Lesquerella garrettii (T)
Penstemon garrettii (PoEx)

Senecio dimorphophyllus
var. intermedius (T)

Wasatch County
Lesquerella garrettii (T)
WASHINGTON COUNTY
Arctomecon humilis (T)
Astragalus ampullarius (T)
Astragalus ensiformis (T)
Cryptantha semiglabra (T)
Draba zionensis (T)
Echinocereus engelmannii var. purpureus (E)
Epilobium nevadense (T)
Erigeron religiousus (E)
Erigeron sionis (E)
Eriogonum corynubosum var. matthewsae (E)
Eriogonum jamesii var. rupicola (T)
Eriogonum thompsonae var. albiflorum (T)
var. thompsonae (T)
Eriogonum zionis (T)
Helianthus deserticolus (T)
Heterotheca jonesii (E)
Hymenopappus filifolius var. tomentosus (T)
Lupinus jonesii (T)
Pediocactus sileri (E)
Penstemon humilis var. obtusifolius (T)
Phacelia anelsonii (T)
Phacelia cephalotes (T)
Phlox gladifloris (T)
Viola charlestonensis (T)
WAYNE COUNTY
Asclepias ruthiae (T)
Astragalus barnebyi (T)
Astragalus castaneiformis var. consobrinus (T)

Astragalus harrisonii (E)
Euphorbia nephradenis (T)
Gilia caespitosa (E)
Phacelia indecora (E)
Sclerocactus wrightiae (E)
WEBER COUNTY
Draba maguirei (T)
Eriogonum nanum (T)

LITERATURE CITED


