

Plant Diversity at Box-Death Hollow Wilderness Area, Garfield County, Utah

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Abstract—"The Box" is a canyon located in the western portion of Box-Death Hollow Wilderness Area, Garfield County, southern Utah. The objectives of this study included: (1) collect, identify and make a checklist of the species of vascular plants found in "The Box," (2) search for threatened and endangered species within the area, (3) provide an opportunity for high school students to develop research skills that contribute to the reservoir of scientific information. During a period of 2 years, students of the Provo High School Botany Club, the club advisor, and others collected and identified 304 species in 63 families. Twenty plant taxa collected during this study had not previously been reported for Garfield County, UT. Species-area relationships at this area are compared to selected locations in Utah.

"The Box" is a north-south trending canyon which begins in an aspen-fir forest near "Hells Backbone" road at an elevation of 2,450 m in the Box-Death Hollow Wilderness area, Garfield County, Utah. From this elevation the forest gradually slopes downward to the riparian community adjacent to Pine Creek. Pine Creek is a clear, fast flowing stream of moderate size. The stream flows through a canyon of sandstone walls that become progressively higher and closer together, forcing the stream-side trail to cross the creek over 40 times. It is impossible to hike through the 16 km canyon without doing some wading. The southern end of the canyon, at 2,040 m, opens to a relatively level pinyon-juniper-sagebrush community seven miles north of Escalante, Utah. The Pine Creek gaging station is located near the canyon mouth.

The rocks of the canyon are sedimentary and of Jurassic and Cretaceous age. The soils are derived primarily from sandstone. They include such soil type as the Mikim clay loam, Yarts sandy loam and Mepsum loamy fine sand (Stokes 1986).

The warmest month is July with an average temperature of 22.4EC. The coldest month is January with an average temperature of -2.4EC. The average annual precipitation for the period 1901 to 1996 totaled 25.5 cm at Escalante. An average of 77.2 cm of snow falls each year at Escalante (Pope and Brough 1986).

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Under the direction of Janet Cooper, the Provo High School Botany Club initiated this study in the fall of 1993. During the following 2 years (1994 and 1995) five collection trips were taken at different times of the year to provide a reliable sample of the canyon's flora. Each collection trip emphasized a different section of the canyon, but on each trip, specimens of species previously unknown in the area were collected throughout the canyon. Plants collected were either immediately identified and pressed or collected in plastic bags and pressed as soon as the group arrived back at camp. Identification and classification followed "A Utah Flora" (Welsh and others 1993). "The Intermountain Flora" (Cronquist and others 1989) was used as a supplementary guide for plant identification.

This project provides the first thorough description of the vascular flora occurring in the study area. The checklist of 304 species in 63 families is included in this report as table 1. Twenty taxa on the list have not previously been reported for Garfield County (table 2). The six largest families include: Asteraceae (50 species), Poaceae (36 species), Rosaceae (16 species), Scrophulariaceae (16 species), Fabaceae (15 species), and Brassicaceae (15 species). Voucher specimens are deposited in the herbarium at Utah Valley State College.

The relative area and floristic richness of the Box Wilderness area is compared with the same characteristics for seven other locations in Utah (table 3). The relationship between species and land area is graphically shown in figure 1. The number of named plant taxa is somewhat linearly related to the logarithm (base 10) of area sampled. The regression of species on the area is statistically significant ($p < 0.05$), but the regression accounts for only slightly more than 50 percent of the variation observed. Nevertheless, the regression line does serve a useful function in that it shows locations that fall above (more species than expected for their area in this analysis) or below the regression line. Locations falling below the line may be poorly collected or have inherently low biodiversity. A reverse explanation could be offered for locations falling above the regression line.

Several points seem worthy of note in figure 1: (1) The Box Wilderness study area appears to be quite thoroughly collected, since it is not unusually complex ecologically in this suite of locations. (2) Two locations below the regression line (the Desert Experimental Range and Tooele County) are more arid than average for this set of locations and somewhat less topographically variable. (3) Zion National Park and Washington County fall far above the regression line: both are topographically complex and well collected.

Table 1—Vascular plant checklist for “The Box”, Death Box Hollow Wilderness Area, Garfield County, UT. Sixty three families, 304 species. LB = plants collected in the lower part of “The Box” (elevation 2,040 to 2,200 m); MB = plants collected in the middle part of “The Box” (elevation 2,200 to 2,500 m); UB = plants collected in the upper part of “The Box” (elevation >2,500 m).

Botanical name	Location	Botanical name	Location
Division Lycopodiophyta		<i>Chaetopappa ericoides</i> (Torr.) Nesom	LB
Family Selaginellaceae		<i>Chrysothamnus linifolius</i> Greene	LB
<i>Selaginella mutica</i> D. C. Eaton	LB	<i>Chrysothamnus nauseosus</i> (Pallas) Britt	LB
Division Equisetophyta		var. <i>arenarius</i> (L.C. Anderson)	
Family Equisetaceae		<i>Chrysothamnus viscidiflorus</i> (Hook.) Nutt.	UB
<i>Equisetum arvense</i> L.	LB, UB	<i>Cirsium neomexicanum</i> var. <i>utahensis</i> (Petrak) Welsh	LB
<i>Equisetum hyemale</i> L.	UB	<i>Erigeron abajoensis</i> Cronq.	UB
<i>Equisetum laevigatum</i> A. Br.		<i>Erigeron awapensis</i> Welsh	UB
Division Polypodiophyta		<i>Erigeron flagellaris</i> Gray	LB
Family Polypodiaceae		<i>Erigeron pumilus</i> Nutt.	LB
<i>Cystopteris fragilis</i> (L.) Bernh.	MB	<i>Gutierrezia sarothrae</i> (Pursh) Britt. & Rusby	UB
Division Pinophyta		<i>Helenium hoopesii</i> Gray	UB
Family Cupressaceae		<i>Helianthella microcephala</i> Gray	LB
<i>Juniperus communis</i> L.	UB, MB	<i>Heterotheca villosa</i> (Pursh) Shinn.	LB
<i>Juniperus osteosperma</i> (Torr.) Little	LB	var. <i>hispida</i> (Hook.) Harms	
<i>Juniperus scopulorum</i> Sarg.	LB	<i>Hymenopappus filifolius</i> Hook.	LB
<i>Ephedra viridis</i> Cov.	LB	var. <i>cinereus</i> (Rydb.) Johnston	
Family Pinaceae (pine)		<i>Hymenoxys acaulis</i> (Pursh) Parker	LB
<i>Picea pungens</i> Engelm.	LB, MB	var. <i>arizonica</i> (Greene) Parker	
<i>Pinus edulis</i> Engelm.	LB, MB	<i>Hymenoxys acaulis</i> (Pursh) parker var. <i>nana</i> Welsh	LB
<i>Pinus ponderosa</i> Lawson	LB, MB	<i>Hymenoxys richardsonii</i> (Hook.) Cockerell	UB
<i>Pseudotsuga menziesii</i> (Mirbel) Franco	UB, MB	<i>Iva axillaris</i> L.	UB
Division Magnoliophyta		<i>Machaeranthera bigelovii</i> (Gray) Green	
Class Magnoliopsida		<i>Machaeranthera canescens</i> (Pursh) Gray	
Family Aceraceae		var. <i>canescens</i>	UB, LB
<i>Acer glabrum</i> Torr.	UB, MB	<i>Machaeranthera grindelioides</i> (Nutt.) Shinn.	LB
<i>Acer negundo</i> L.	MB	<i>Psilostrophe sparsiflora</i> (Gray) A. Nels.	LB
Family Amaranthaceae		<i>Senecio douglasii</i> DC.	MB
<i>Amaranthus retroflexus</i> L.	LB	<i>Senecio eremophilus</i> Richards.	UB
Family Anacardiaceae		<i>Senecio multilobatus</i> T. & G.	UB
<i>Rhus aromatica</i> Ait var. <i>trilobata</i> (Nutt.) Gray	LB	<i>Senecio spartioides</i> T. & G. var. <i>spartioides</i>	LB
Family Apiaceae		<i>Stephanomeria spinosa</i> (Nutt.) Tomb	UB
<i>Angelica pinnata</i> Wats.	UB	<i>Stephanomeria tenuifolia</i> (Torr.) Hall	LB
<i>Conioselinum scopulorum</i> (Gray) Coult & Rose	UB	<i>Taraxacum officinale</i> Weber ex Wiggers	UB
<i>Cymopterus lemmonii</i> (Coult. & Rose) Dorn	LB	<i>Tetradymia canescens</i> DC.	UB
<i>Cymopterus purpureus</i> Wats.	LB	<i>Townsendia incana</i> Nutt.	LB
<i>Ligusticum porteri</i> Coult. & Rose	UB	<i>Tragopogon dubius</i> Scop.	LB
<i>Lomatium latilobum</i> (Rydb.) Mathias	LB	Family Berberidaceae	
<i>Osmorhiza depauperata</i> H. & A.	UB	<i>Mahonia repens</i> (Lindl.) G. Don	MB
Family Apocynaceae		Family Betulaceae	
<i>Apocynum androsaemifolium</i> L.	LB	<i>Betula occidentalis</i> Hook.	UB
Family Asclepiadaceae		Family Boraginaceae	
<i>Asclepias asperula</i> (Decne.) Woodson	LB	<i>Cryptantha confertiflora</i> (Greene) Payson	LB
Family Asteraceae		<i>Cryptantha fulvocanescens</i> (Wats.) Payson	LB
<i>Achillea millefolium</i> L.	UB	<i>Cryptantha pterocarya</i> (Torr.) Greene	LB
<i>Ambrosia acanthicarpa</i> Hook.		<i>Lappula occidentalis</i> (Wats.) Greene	LB
<i>Antennaria neglecta</i> Greene	LB	<i>Lithospermum multiflorum</i> Torr. ex A. Gray	UB, LB
<i>Antennaria parvifolia</i> Nutt.	MB	<i>Lithospermum ruderales</i> Dougl. ex Lehm	LB
<i>Artemisia bigelovii</i> Gray	LB	<i>Mertensia arizonica</i> Greene	MB
<i>Artemisia campestris</i> L.	LB	Family Brassicaceae	
<i>Artemisia carruthii</i> Wood ex Carruth	LB	<i>Arabis demissa</i> Greene	MB
<i>Artemisia frigida</i> Willd.	LB	<i>Arabis holboellii</i> Hornem. var. <i>pinetorum</i> (Tidestr.) Rollins	LB
<i>Artemisia ludoviciana</i> Nutt.	UB	<i>Cardamine cordifolia</i> Gray	UB
<i>Artemisia tridentata</i> var. <i>tridentata</i> Nutt.	LB	<i>Chorispora tenella</i> (Pallas) DC.	LB
<i>Aster ascendens</i> Lindl.	MB	<i>Descurainia californica</i> (Gray) Schulz	LB
<i>Aster chilensis</i> Nees	UB	<i>Descurainia richardsonii</i> (Sweet) Schulz	LB
<i>Aster foliaceus</i> Lindl. in DC. var. <i>parryi</i> (D.C. Eaton) Gray	UB	var. <i>sonnei</i> (Robins.) C.L. Hitchc	
<i>Aster glaucodes</i> Blake	UB	<i>Draba</i> sp.	UB
<i>Aster occidentalis</i> (Nutt.) T. & G.	LB	<i>Lepidium montanum</i> Nutt. var. <i>jonesii</i> (Rydb.) C.L. Hitchc.	LB
<i>Bahia dissecta</i> (Gray) Britt.		<i>Lesquerella intermedia</i> (Wats.) Heller	LB
<i>Brickellia grandiflora</i> (Hook.) Nutt.		<i>Lesquerella ludoviciana</i> (Nutt.) Wats.	MB
<i>Brickellia microphylla</i> (Nutt.) var. <i>scabra</i> Gray	LB	<i>Lesquerella rectipes</i> Woot. & Standl.	LB

(con.)

Table 1 (Con.)

Botanical name	Location	Botanical name	Location
<i>Physaria newberryi</i> Gray	LB	<i>Geranium viscosissimum</i> Fisch. and Mey.	LB
<i>Streptanthella longirostris</i> (Wats.) Rydb	LB	Family Hydrophyllaceae	
<i>Streptanthus cordatus</i> Nutt. ex T. & G.	LB	<i>Phacelia ivesiana</i> Torr. in Ives var. <i>ivesiana</i>	LB
<i>Thlaspi montanum</i> L. var. <i>montanum</i>	LB	Family Lamiaceae	
Family Cactaceae		<i>Mentha arvensis</i> L.	LB
<i>Echinocereus triglochidiatus</i> Engelm.	LB	<i>Monardella odoratissima</i> Benth	UB
<i>Opuntia fragilis</i> (Nutt.) Haw.	LB	Family Malvaceae	
<i>Opuntia phaeacantha</i> Engelm.	LB	<i>Sidalcea candida</i> Gray	UB
<i>Opuntia polyacantha</i> Haw.	LB	<i>Sphaeralcea coccinea</i> (Nutt.) Rydb	LB
Family Campanulaceae		<i>Sphaeralcea parvifolia</i> A. Nels.	LB
<i>Campanula parryi</i> Gray	LB	Family Monotropaceae (Indian-pipe)	
<i>Campanula rotundifolia</i> L.	LB	<i>Pterospora andromeda</i> Nutt.	UB
Family Capparaceae		Family Nyctaginaceae	
<i>Cleome lutea</i> Hook.	LB	<i>Abronia fragrans</i> Nutt. ex Hook	LB
Family Caprifoliaceae		<i>Boerhaavia spicata</i> var. <i>torreyana</i> Wats.	LB
<i>Lonicera involucrata</i> (Richards.) Banks ex Sprengel	UB	<i>Mirabilis linearis</i> var. <i>decipiens</i> (Standley) Welsh	
<i>Sambucus caerulea</i> Raf.	LB	<i>Mirabilis linearis</i> (Pursh) Heimerl var. <i>linearis</i>	LB
<i>Sambucus racemosa</i> L.	MB	<i>Mirabilis oxybaphoides</i> (Gray) Gray in Torr	LB
<i>Symphoricarpos oreophilus</i> Gray	UB	Family Oleaceae	
Family Caryophyllaceae		<i>Fraxinus anomala</i> Torr. ex Wats.	LB
<i>Arenaria fendleri</i> Gray	LB	Family Onagraceae	
<i>Arenaria macradenia</i> Wats.	LB	<i>Epilobium angustifolium</i> L.	UB
<i>Stellaria longipes</i> Goldie var. <i>longipes</i>	UB	<i>Epilobium halleanum</i> Hausskn.	LB
Family Chenopodiaceae		<i>Oenothera caespitosa</i> var. <i>marginata</i> (Nutt.) Munz.	LB
<i>Chenopodium fremontii</i> Wats.	UB	<i>Oenothera flava</i> (A. Nels.) Garrett var. <i>flava</i>	UB
<i>Chenopodium graveolens</i>	LB	<i>Oenothera pallida</i> Lindl.	LB
var. <i>neomexicana</i> (Aellen) Aellen		Family Plantaginaceae	
<i>Chenopodium leptophyllum</i> (Moq.) Wats.	LB	<i>Plantago patagonica</i> Jacq.	LB
<i>Monolepis nuttalliana</i> (Schultes) Greene	LB	Family Polemoniaceae	
<i>Salsola pestifer</i> A. Nels.	LB	<i>Gilia aggregata</i> (Pursh) Sprengel	MB
Family Cornaceae		<i>Gilia congesta</i> Hook. var. <i>frutescens</i> (Rydb.) Cronq.	LB
<i>Cornus sericea</i> L.	UB, MB	<i>Leptodactylon pungens</i> (Torr.) Nutt.	LB
Family Elaeagnaceae		<i>Linanthastrum nuttallii</i> (Gray) Ewan	LB
<i>Elaeagnus angustifolia</i> L.	LB	<i>Linanthus bigelovii</i> (Gray) Greene	
<i>Shepherdia canadensis</i> (L.) Nutt.	UB	<i>Phlox pulvinata</i> (Wherry) Cronq.	LB
<i>Shepherdia rotundifolia</i> Parry	LB	<i>Phlox tumulosa</i> Wherry	LB
Family Ericaceae		Family Polygalaceae	
<i>Arctostaphylos patula</i> Greene	LB	<i>Polygala subspinoso</i> Wats.	LB
Family Euphorbiaceae		Family Polygonaceae	
<i>Euphorbia brachycera</i> Engelm. in Emory	MB	<i>Eriogonum alatum</i> Torr. in Sitgr.	LB
<i>Euphorbia micromera</i> Boiss.	LB	<i>Eriogonum cernuum</i> Nutt.	LB
Family Fabaceae		<i>Eriogonum palmerianum</i> Reveal in Munz	LB
<i>Astragalus argophyllus</i> Nutt. ex T. & G.	LB	<i>Eriogonum racemosum</i> Nutt.	LB
<i>Astragalus ceramicus</i> Sheldon	LB	<i>Eriogonum subreniforme</i> Wats.	LB
<i>Astragalus kentrophyta</i> Gray	LB	<i>Rumex patens</i> L.	UB
<i>Astragalus mollissimus</i> Torr.	LB	Family Portulacaceae	
<i>Astragalus subcinereus</i> Gray	LB	<i>Portulaca oleracea</i> L.	LB
<i>Astragalus utahensis</i> (Torr.) T. & G.	LB	Family Primulaceae	
<i>Dalea searlsiae</i> (Gray) Barneby.	LB	<i>Androsace septentrionalis</i> L.	UB
<i>Lotus utahensis</i> Ottley	LB	<i>Primula parryi</i> Gray	LB
<i>Lupinus sericeus</i> Pursh	LB	Family Pyrolaceae	
<i>Medicago sativa</i> L.	LB	<i>Pyrola chlorantha</i> Swartz	UB
<i>Melilotus albus</i> Desr. ex Lam.	LB	<i>Pyrola secunda</i> L.	UB
<i>Melilotus officinalis</i> (L.) Pallas	LB	Family Ranunculaceae	
<i>Oxytropis deflexa</i> (Pallas) DC. var. <i>sericea</i> T. & G.	UB	<i>Aconitum columbianum</i> Nutt. in T. & G.	UB
<i>Thermopsis montana</i> Nutt. in T. & G.	LB	<i>Actaea rubra</i> (Ait.) Willd.	UB
<i>Trifolium repens</i> L.	UB	<i>Clematis columbiana</i> (Nutt.) T. & G.	UB
Family Fagaceae		<i>Clematis ligusticifolia</i> Nutt.	LB
<i>Quercus gambelii</i> Nutt.	LB	<i>Ranunculus cymbalaria</i> Pursh	UB
Family Gentianaceae		<i>Ranunculus inamoenus</i> Greene	UB
<i>Swertia radiata</i> (Kellogg) Kuntze	UB	<i>Ranunculus repens</i> L.	UB
Family Geraniaceae		<i>Thalictrum fendleri</i> Engelm. ex Gray	UB, MB
<i>Geranium caespitosum</i> James	LB, UB	Family Rhamnaceae	
<i>Geranium richardsonii</i> Fisch. and Trautv.	UB	<i>Ceanothus fendleri</i> Gray	MB

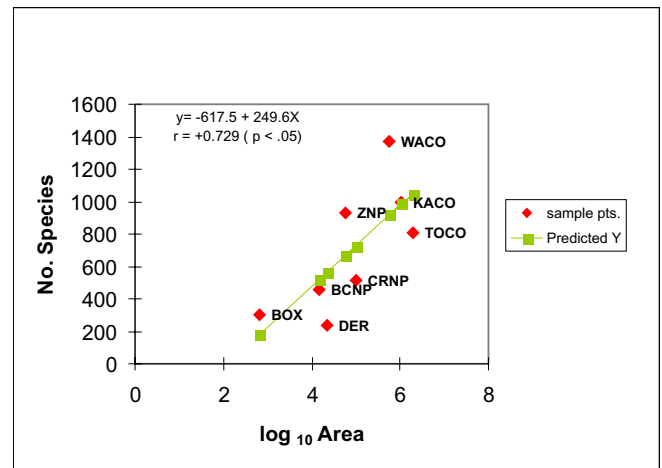
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Table 1 (Con.)

Botanical name	Location	Botanical name	Location
Family Rosaceae		<i>Arceuthobium douglasii</i> Engelm.	UB
<i>Amelanchier alnifolia</i> (Nutt.) Nutt.	UB	<i>Phoradendron juniperinum</i> Gray	LB
<i>Amelanchier utahensis</i> Koehne	LB	Class Liliopsida	
<i>Cercocarpus intricatus</i> Wats.	LB	Family Agavaceae	
<i>Fragaria virginiana</i> Duchesne	UB	<i>Yucca harrimaniae</i> Trel.	LB
<i>Geum macrophyllum</i> Willd.	UB	Family Commelinaceae	
<i>Holodiscus dumosus</i> (Nutt.) Heller	MB	<i>Tradescantia occidentalis</i> (Britt.) Smyth	LB
<i>Physocarpus alternans</i> (Jones) J.T. Howell	MB	Family Cyperaceae	
<i>Potentilla concinna</i> Richards	UB,MB	<i>Carex aquatilis</i> Wahl.	LB
<i>Potentilla crinita</i> Gray	UB	<i>Carex praeegracilis</i> W. Boot.	UB
<i>Potentilla fruticosa</i> L.	UB	<i>Carex lanuginosa</i> Michx.	UB
<i>Potentilla ovina</i> Macoun	UB	<i>Carex microptera</i> Mack.	UB, LB
<i>Prunus virginiana</i> L.	UB, MB	<i>Carex nebraskensis</i> Dewey	LB
<i>Purshia mexicana</i> (D. Don) Welsh	LB, MB	<i>Carex rossii</i> F. Boott	UB
var. <i>stansburyana</i> (Torr.) Welsh		<i>Carex rostrata</i> Stokes ex With.	LB
<i>Purshia tridentata</i> (Pursh) DC.	MB	<i>Eleocharis palustris</i> (L.) R. & S.	LB
<i>Rosa woodsii</i> Lindl.	LB	Family Iridaceae	
<i>Rubus idaeus</i> L.	MB	<i>Sisyrinchium demissum</i> Greene	LB
Family Salicaceae		Family Juncaceae	
<i>Populus angustifolia</i> James	LB, MB	<i>Juncus arcticus</i> Willd.	LB, UB
<i>Populus balsamifera</i> L. var. <i>trichocarpa</i> (T. & G.) Brayshaw	MB	<i>Juncus ensifolius</i> Wikstrom	UB
<i>Populus tremuloides</i> Michx.	UB, MB	Family Liliaceae	
<i>Salix bebbiana</i> Sarg.	UB	<i>Allium cernuum</i> Roth	LB
<i>Salix boothii</i> Dorn	MB	<i>Fritillaria atropurpurea</i> Nutt.	MB
<i>Salix brachycarpa</i> Nutt.	UB	<i>Smilacina stellata</i> (L.) Desf.	LB, MB
<i>Salix drummondiana</i> Barratt in Hook.	MB	Family Orchidaceae	
<i>Salix exigua</i> Nutt.	LB	<i>Habenaria sparsiflora</i> Wats.	MB
<i>Salix geyeriana</i> Anderss.	UB	Family Poaceae	
Family Santalaceae		<i>Agropyron cristatum</i> (L.) Gaertner var. <i>desertorum</i>	LB
<i>Comandra umbellata</i> (L.) Nutt.	LB	<i>Agrostis stolonifera</i> L.	LB
Family Saxifragaceae		<i>Aristida purpurea</i> Nutt.	LB
<i>Fendlerella utahensis</i> (Wats.) Heller	LB	<i>Bouteloua gracilis</i> (H.B.K.) Lag. ex Steudel	LB
<i>Heuchera parvifolia</i> Nutt. in T. & G. var. <i>utahensis</i>	LB	<i>Bromus carinatus</i> H. & A.	UB
<i>Heuchera rubescens</i> Torr. in Stansbury	MB, UB	<i>Bromus ciliatus</i> L.	UB
<i>Ribes cereum</i> Dougl.	UB, MB	<i>Bromus inermis</i> Leysser	UB
<i>Ribes inerme</i> Rydb.	UB, MB	<i>Bromus tectorum</i> L.	LB
<i>Saxifraga odontoloma</i> Piper	UB, MB	<i>Catabrosa aquatica</i> (L.) Beauv.	UB
Family Scrophulariaceae		<i>Elymus elymoides</i> (Raf.) Swezey	UB
<i>Castilleja flava</i> Wats.		<i>Elymus glaucus</i> Buckley	UB
<i>Castilleja linariifolia</i> Benth.	LB	<i>Elymus hispidus</i> (Opiz) Meld.	UB
<i>Castilleja scabrida</i> Eastw.	LB	<i>Elymus junceus</i> Fisch.	LB
<i>Mimulus guttatus</i> DC.	UB	<i>Elymus smithii</i> (Rydb.) Gould	LB
<i>Orthocarpus purpureo-albus</i> Gray	LB	<i>Elymus trachycaulus</i> (Link) Gould ex Shinn	UB
<i>Penstemon barbatus</i> (Cav.) Roth.	UB	<i>Festuca octoflora</i> Walter	LB
<i>Penstemon breviculus</i> (Keck) Nisbet & R. Jackson	LB	<i>Festuca ovina</i> L.	LB
<i>Penstemon eatonii</i> Gray	LB	<i>Hilaria jamesii</i> (Torr.) Benth.	LB
<i>Penstemon linarioides</i> Gray	LB	<i>Muhlenbergia andina</i> (Nutt.) A. S. Hitchc.	
<i>Penstemon moffattii</i> Eastw.	LB	<i>Muhlenbergia asperifolia</i> (Nees & Mey.) Parodi	
<i>Penstemon ophianthus</i> Pennell	LB	<i>Muhlenbergia richardsonis</i> (Trin.) Rydb	UB
<i>Penstemon pachyphyllus</i>	LB	<i>Muhlenbergia thurberi</i> Rydb.	UB
var. <i>mucronatus</i> (N. Holmgren) Neese		<i>Munroa squarrosa</i> (Nutt.) Torr.	LB
<i>Penstemon strictus</i> Benth.	LB	<i>Poa compressa</i> L.	LB
<i>Penstemon utahensis</i> Eastw.	LB	<i>Poa fendleriana</i> (Steudel) Vasey	LB
<i>Veronica americana</i> Schwein. ex Benth	LB	<i>Poa nervosa</i> (Hook.) Vasey	UB
<i>Veronica arvensis</i> L.	UB	<i>Poa palustris</i> L.	UB
Family Urticaceae		<i>Poa pratensis</i> L.	LB
<i>Urtica dioica</i> L.	UB	<i>Poa trivialis</i> L.	UB
Family Valerianaceae		<i>Schizachyrium scoparium</i> (Michx.) Nash in Small	LB
<i>Valeriana edulis</i> Nutt. ex T. & G.	UB	<i>Sporobolus cryptandrus</i> (Torr.) Gray	LB
Family Violaceae		<i>Sporobolus flexuosus</i> (Thurber) Rydb.	LB
<i>Viola adunca</i> J.E. Sm. ex Rees	UB	<i>Stipa comata</i> Trin. & Rupr.	LB
<i>Viola nephrophylla</i> Greene	UB	<i>Stipa coronata</i> Thurber	LB
Family Viscaceae		<i>Stipa hymenoides</i> R. & S.	UB
<i>Arceuthobium americanum</i> Nutt. ex Engelm. in Gray	LB	<i>Stipa lettermanii</i> Vasey	UB
<i>Arceuthobium divaricatum</i> Engelm.	LB, MB		

Table 2—Species collected in “The Box” that are new records for Garfield County, Utah.

<i>Astragalus argophyllus</i> var. <i>martinii</i>
<i>Boerhaavia spicata</i> var. <i>torreyana</i>
<i>Campanula rotundifolia</i>
<i>Chrysothamnus nauseosus</i> var. <i>arenarius</i>
<i>Cryptantha pterocarya</i> var. <i>pterocarya</i>
<i>Elymus glaucus</i>
<i>Epilobium hallaenum</i>
<i>Geranium viscosissimum</i>
<i>Habenaria sparsiflora</i> var. <i>laxiflora</i>
<i>Hymenoxys acaulis</i> var. <i>nana</i>
<i>Linanthus biglovii</i>
<i>Lithospermum ruderale</i>
<i>Lomatium latilobum</i>
<i>Opuntia phaeacantha</i> var. <i>phaeacantha</i>
<i>Penstemon barbatus</i>
<i>Phlox tumulosa</i>
<i>Poa compressa</i>
<i>Poa nervosa</i>
<i>Populus balsamifera</i>
<i>Rumex patens</i>
<i>Salix drummondiana</i>
<i>Veronica arvensis</i>

**Figure 1**—The relationship between area and plant diversity at eight locations in Utah. (BCNP = Bryce Canyon National Park; BOX = Box Wilderness study area; CRNP = Capitol Reef National Park; DER = Desert Experimental Range; KACO = Kane County; TOCO = Tooele County; WACO = Washington County).

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Table 3—Area and number of species and sub-specific taxa at each of several locations in Utah. The literature source for the information at each location is shown.

Location	Area	Number of		
		Families	Genera	Species
<i>ha</i>				
Box Wilderness ^a	648	63	175	304
Desert Experimental Range ^b	22,543	42	134	240
Bryce Canyon National Park ^c	15,092	73	232	458
Capitol Reef National Park ^d	97,937	74	280	512
Zion National Park ^e	59,926	94	402	929
Kane County ^f	1,075,828	92	399	998
Tooele County ^f	1,914,592	84	380	881
Washington County ^f	584,121	110	556	1,374

^aThis manuscript.

^bGoodrich (1986).

^cSpence and Buchanan (1993).

^dMeyer (1982).

^eHarper, Sanderson, and McArthur (2001).

^fAlbee, Schulz, and Goodrich (1988).

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