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Checklist of the vascular flora of the Kaibab Plateau, Coconino County, Arizona

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ABSTRACT.—Seven hundred and ninety-two vascular plant taxa were documented for the Kaibab Plateau through a review of herbarium records (primarily online) and targeted fieldwork focusing on springs, natural ponds, cattle tanks, and sinkholes. Taxa not previously published or currently recorded on SEINet for the Kaibab Plateau include 7 taxa for Grand Canyon National Park, 4 taxa for the Kaibab National Forest, 51 taxa for the Kaibab Plateau, 6 taxa for Coconino County, and 5 taxa for the state of Arizona. Two hundred and thirty previously published records or records on SEINet were eliminated from the flora area by reviewing specimens that were either misidentified or mismapped.

SITE DESCRIPTION

The Kaibab Plateau (KP), located in Coconino County in northern Arizona and Kane County in southern Utah (Figs. 1, 2), is the southernmost plateau of the high plateaus that extend south through Utah. It is dominated by spruce-fir forests at upper elevations and ponderosa pine forests at lower elevations, with meadows between forested ridges. The dense, shaded spruce-fir forests are a southward extension of a vegetation type that is widespread just below the tundra in the Rocky Mountains and the Intermountain Region (Phillips et al. 1987). This high plateau is separated from similar habitats by deserts in every direction, limiting plant dispersal and reproductive interaction with plants from similar but distant habitats (MacArthur and Wilson 1967).

Our goal was to document the vascular flora of the upper-elevation sky island portion of the KP, as well as provide additional information related to the distribution and relative abundance of species of special concern, such as threatened and endangered species and exotics. Twenty-two Grand Canyon National Park (GRCA) special status plant species listed by Brian (2000), 26 species tracked by the Arizona State Natural Heritage Program (2007–2020a, 2007–2020b), and 20 species considered in Kaibab National Forest planning (Hannemann and Foster 2014) are listed in Table 1. Seven taxa in Table 1 are endemic to the KP and its immediate environs. The KP harbors 2 plant species, Castilleja kaibabensis (Kaibab paintbrush) and Physaria kingii subsp. kaibabensis (Kaibab bladderpod) that are endemic to its high meadows (Reichenbacher 1986, Spence 2006, 2007, Rink 2016). Locating new populations of these special status and endemic plant species was a focus of our 2007–2015 field effort.

SITE DESCRIPTION

The study site, which includes upper elevations of the KP, has an elevational range of approximately 2130–2800 m (6900–9200 ft).
The lower elevational limit for this checklist is somewhat arbitrary, with the intention of capturing the unique flora of the upper elevations of the KP and lower portion of the ponderosa pine–Douglas-fir communities. By so doing, we included steep xeric and mesic terrain below the rim as well as hanging gardens. With the exception of the higher regions of the Powell Plateau, high buttes or mesas within GRCA were not included. The boundary of our study area (Fig. 1) is well defined by the upper portions of the rim of the Grand Canyon; where that rim falls below the ponderosa pine zone on the west, our boundary follows the Winter Road (FRs 425, 427, and 423 to FR 22). The boundary continues, making a northern arc with a radius of 8–10 km around Jacob Lake at the lower level of the ponderosa pine zone to the East Side Game Road (FR 220), through Saddle Mountain Wilderness and to the east rim of the KP. Although Rasmussen (1941) places the lower elevational limit of the KP at 1830 m (6000 ft) with an area of 95 km (60 mi) by 55 km (35 mi) and 2980 km² (1152 mi²), our study area is ca. 1880 km² (725 mi²).

The northern two-thirds (ca. 1450 km² [560 mi²]) of our study area is Kaibab National Forest (KNF) administered by the North Kaibab Ranger District (NKRD); while the southern third (ca. 430 km² [166 mi²]) is managed by GRCA. The KNF portion of the KP includes the *Pediocactus paradoxii* Conservation Area, which is managed to preserve the unique plants there (USDA 1997, Hannemann and Foster 2014), and the Franks Lake Geologic Botanic Area, which is managed to preserve natural features (Hannemann and Foster 2014).

The study area falls north of 36°07′ N latitude and between −111°54′ and −112°23′ W longitude at Cape Final and Swamp Point, respectively. United States Geological Survey 7.5-minute topographic quadrangles that cover the study area are the following: Big Springs, Bright Angel Point, Kane Ranch, Cape Royal, Cooper Ridge, De Motte Park, Dog Point, Havasupai Point, House Rock, Jacob Lake, Kanabwunts Spring, King Arthur Castle, Little Park Lake, Point Imperial, Powell Plateau, Shiva Temple, Sowats Spring, Tapeats Amphitheater, Telephone Hill, Timp Point, Walhalla
Geology

The substrate of the Kaibab Plateau is made of up of 5 mostly flat-lying Paleozoic sedimentary formations. Porous Kaibab Limestone caps the majority of the study area. Toroweap Limestone occurs at the floor of several of the deeply incised canyons (i.e., Big Spring Canyon, Kanab Canyon, Kanabowlinds Canyon, Walla Valley, Crystal Creek, Milk Creek, Outlet Canyon, Thompson Canyon, Fuller Canyon, and Bright Angel Creek). A large meadow in GRCA called the “Basin” has eroded enough to reveal both the Toroweap Limestone and the underlying Coconino Sandstone (Billingsley 2000, Billingsley et al. 2008, 2012, Huntoon and et al. 1996). The Toroweap Limestone and the Coconino Sandstone also occur in the study area on steep slopes below the rim (Moore et al. 1960, Huntoon et al. 1996). The deepest canyons erode into the Hermit Shale and Supai Sandstone, formations easily recognized by their red color. Information about the soils of the KP can be found on a U.S. Forest Service–produced map (Brewer et al. 1991).

Flowing, perennial streams on the KP are limited to areas immediately downstream of springs. Dutton (1882, p. 132) observed, “the very absence of these traces of running water constitutes one of the greatest charms of the Kaibab, for every ravine is smooth as a lawn and carpeted with a turf of mountain grass, richly decked with flowers of rare beauty and luxuriance.” Most rainfall and snowmelt seeps into the uppermost 3 stratigraphic layers: the Kaibab, Toroweap, and Coconino formations. Accumulation of fine soils has sealed some sinkholes causing water to be retained, forming small lakes and ponds (Rasmussen 1941, Huntoon 1974), which were included as targets of the work reported on here.

Climate

The KP is mesic compared to the surrounding region. The average annual precipitation at the southern end of the KP at Bright Angel Ranger Station at 2560 m (8400 ft) was 63.88 cm (25.15 in) for the period 1925–2016, while that at the northern end of the KP at Jacob Lake at 2400 m (7900 ft) was 53 cm (20.89 in) from 1916 to 1987 (WRCC 2020). The precipitation is bimodal, primarily falling as snow during the winter, typically with over 254 cm (100 in) of snow annually, reaching depths of 70–100 cm (2–3 ft). The early summer is often dry, but by late summer, monsoonal precipitation arrives nearly every afternoon. These rain showers can be intense but are often spotty in their distribution. The KP portion of GRCA has an average frost-free period of 93 d (Merkle 1954).

Vegetation

Rasmussen (1941), Warren et al. (1982), Galeano (1984), White and Vankat (1993), Moore and Huffman (2004), Binkley et al. (2006), Mast and Wolf (2006), Kearsley et al. (2015), and Sesnie et al. (2012) have contributed to the description of the vegetation of the KP, and their work is summarized here along with the authors’ personal observations.

The higher-elevation forests of the KP are dominated by Picea pungens (blue spruce), Picea engelmannii (Engelmann spruce), Pinus
Table 1. Taxa known to occur on the Kaibab Plateau that have agency rare plant status: 22 GRCA special status species (Brian 2000), 26 species tracked by the Arizona State Heritage Program (https://drive.google.com/drive/folders/0BwLs0i-QWFsM5TFXeXplISWiZ0Xe), and 20 species considered in Kaibab National Forest Planning (Hannemann and Foster 2014). USDA rankings are as follows:

F0 = occurs off the KNF
F1 = extremely rare on the KNF
F2 = very rare on the KNF
F3 = rare and uncommon on the KNF
F4 = widespread abundant on the KNF
FP = potential habitat on the KNF but species not known to occur

Frye (2009), Holsten and Phillips (1998), and Phillips (2005a) reported on a variety of KP rare plants.

<table>
<thead>
<tr>
<th>Family</th>
<th>Species name</th>
<th>GRCA special status</th>
<th>AZ status</th>
<th>USDA ranking</th>
<th>Citations</th>
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<td>AZ</td>
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<td>AZ</td>
<td>F1</td>
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</tr>
</tbody>
</table>

*Seven taxa marked with an asterisk are endemic to the KP and its immediate environs.
ponderosa (ponderosa pine), Abies lasiocarpa (subalpine fir), and A. concolor (white fir), with large stands of Populus tremuloides (quaking aspen) and Pseudotsuga menziesii (Douglas-fir). Juniperus communis (dwarf juniper) and Carex siccata (dryspike sedge) dominate the understory. Lower and drier forests on the KP, particularly on the Walhalla Plateau, are dominated by Pinus ponderosa, with an understory of Carex siccata, C. rossii (Ross’ sedge), C. occidentalis (western sedge), and Berberis repens (creeping mahonia).

Meadows lying between forested areas support a high level of plant diversity, including at least 60 dicots and more than 20 monocots (Spence 2007) including Carex spp. (sedges), Poa spp. (bluegrasses), Deschampsia spp. (hairgrasses), Eremogone spp. (sandworts), Cryptantha setosissima (bristly cryptantha), Achillea millefolium (western yarrow), Potentilla spp. (cinquefoils), Penstemon pseudoputus (beard-tongue), Solidago spp. (goldenrods), Ipomopsis spp. (ipomopsis), Agoseris spp. (agoseris), Hymenoxys subintegra (Arizona rubberweed), Castilleja spp. (paintbrushes), and Eriogonum racemosum (buckwheat). These meadows harbor 2 endemics: Castilleja kaibabensis (Kaibab paintbrush) and Physaria kingii subsp. kaibabensis (Kaibab bladderpod).

Ponds and lakes, which were the targets of much of our field effort, occur in both forest and meadow habitats dominated by Carex spp. and Eleocharis spp. (spike rush) and Juncus spp. (rushes). Margaret Moore and D. Huffman (2004) noted that trees have been encroaching on KP meadows since the early 1900s and that the forest vegetation could completely replace the meadow vegetation within the next several decades.

Steep north-facing slopes harbor mesic species not found elsewhere on the KP including Pyrola (wintergreen), Proseratess trachycarpa (roughfruit fairybell), Acer glabrum (Rocky Mountain maple), A. grandidentatum (bigtooth maple), and Physocarpus malvaceus (ninebark). Slopes of other aspects harbor xeric species more typical of lower elevations. Such slopes support many woodland and shrubby plants including Pinus edulis (pinyon), Juniperus spp. (juniper), Quercus gambelii (Gambel oak), Chrysothamnus and Ericameria spp. (rabbitbrush), Atriplex canescens (four-wing saltbush), Amelanchier spp. (serviceberry), Ribes spp. (currant), and Artemisia spp. (sagebrush).

Warm winds from within the canyon create microclimates that allow plants that typically grow at lower elevations to grow at higher locations along rim margins (Halvorson 1972, Phillips et al. 1987). Common plants of cliffs and hanging gardens below the rim include Ivesia arizonica (rock whitefeather), Cirsium spp. (thistles), Calamagrostis scopulorum (ditch reedgrass), Aletes mac dougalii (MacDougal’s Indian parsley) and Muhlenbergia andina (foxtail muhly).

Weng and Jackson (1999) studied sediment cores at Fracas Lake, about 10 miles southwest of Jacob Lake, and at Bear Lake, just north of the GRCA boundary, where they reported that prior to 13,000 years before present (BP), the upper elevations of the KP were covered by alpine tundra and that the species making up present-day forests arrived by 8000 years ago.

**LAND USE HISTORY**

The history of land use has a direct and significant impact on the plants found in an area. Human history can often explain the occurrence of specific plants at specific locations.

**Prehistory**

Stone points dating to ca. 6000 years BP were uncovered during a 1983 archaeological survey (Fairley et al. 1984) of the Highway 67 right-of-way that bisects the KP. This archaeological find may be the earliest evidence of human occupation on the KP (Azar 2005). Later-period agricultural sites and Puebloan structures occur at many places on the KP (Altschul and Fairley 1989), with high concentrations on the Walhalla and Powell Plateaus. Elsewhere, sites usually occur close to the southern edge of the rim of the Grand Canyon and near travel routes leading into the canyon (Hall 1942, Abbott 1979, Fairley et al. 1984, Hughes 1991, Schroedl et al. no date). The KP was the summer home for the Kaibabits, a division of the Paiute, who, with the Navajo people, used the area as a deer hunting ground (Rasmussen 1941), calling the area “Kaibab” which translates as “mountain lying down.” In the early 1900s, settlers of the Kanab area found Native American camps with as many as 1000 deer carcasses in one camp (Mann and Locke 1931). People harvested so many deer hides on the KP during that time that the plateau
acquired the name Buckskin Mountain (Jones and DeMille 1986).

**Grazing**

Clarence Dutton (1882), of the Powell survey, commented that wild cattle were present on the KP at the time of his visit in 1879–1881. Two thousand cattle were placed on the KP during 1885 and 1886, and “in 1887 and 1889, at least 200,000 sheep and 20,000 cattle and many horses were using the range and surrounding desert country and the Kaibab Mountain” (Mann and Locke 1931). During 1908 and 1909, approximately 60,000 head of cattle (Rider 1985) and ca. 80,000 sheep (Hodgkin 1962) were on the Kaibab Forest. Several dairy ranches also operated on the KP (Jones and DeMille 1986, Hodgin 1962). By 1962, there were only 2200 cattle and of these, only 800 were on summer range. As of 2020, Grand Canyon Trust manages 600 cattle on 850,000 acres of the KP, alternating between the “north” and the “south” pastures every year (E. Grumbine, GC Trust Ranch Manager, personal communication 2015; https://www.grandcanyontrust.org/north-rim-ranches).

**Bison**

There is no direct evidence for the existence of bison (*Bison bison*) on the KP prior to 1905. In that year and in 1906, “Buffalo” Jones and Jimmy Owens introduced bison to the KP. Since that time, the bison have alternated between the KP and House Rock Valley. They were present into the 1920s (Anderson 2000) when GRCA leased a portion of the southern end of the Walhalla Plateau for bison grazing (Horn 2008). By the 1930s, the bison were spending most of their time in the House Rock Valley. Later, by the mid-1990s, they roamed freely, spending more time on the KP, especially in GRCA, rarely returning to the House Rock Valley (R. Jacoby, KP bison hunting guide and recognized KP bison expert, personal communication 2018). The boundary of GRCA is not effectively fenced, so cattle and bison freely range onto GRCA. Bison negatively affect the vegetation at springs and ponds on the KP, both by trampling and wallowing. Wallowing both disturbs aquatic vegetation in ponds and creates depressions in meadows, devoid of vegetation. Pushed by winter snows, bison move to the west rim of the KP, then make their way down to springs along the Hermit Shale within GRCA and impact sensitive wetlands and hanging gardens (Rink personal observation; Reimondo 2012, Reimondo et al. 2015). The lakes and wetland areas within GRCA that do not exclude bison and cattle have more bare soil as well as reduced vegetative cover, height, and biomass, as well as differences in species composition (Reimondo 2012).

Historically, GRCA has encouraged bison within the park with the goal of enhancing the visitor experience (Anderson 2000). However, as the herd continues to grow, the damage bison do to ecosystems within GRCA is increasing and this situation is starting to elicit a response from GRCA management.

**Logging**

Logging started on the KP by the 1870s. Many sawmills operated at various times and sites, including at Big Springs, De Motte Park, Le Fevre Ridge, Castle, Franks, Jacob, Mile and a Half, and Three Lakes; as well as Orderville, Lookout, Mangum, Riggs, and Le Fevre Canyons (Jones and DeMille 1986, Azar no date). Logging peaked in the late 1940s (Anderson 2000) and 1950s, when loggers cut one million board feet of timber per week (Jones and DeMille 1986). Timber harvesting was intensive into the 1990s, and the salvage of burned timber continues to this day (Azar personal communication 2015; Wahfeld 1993). Changes in forest structure related to logging over the last 100 years include the presence of higher densities of small trees, commonly called dog-hair thickets (Garrett et al. 1997).

**Mining**

Beginning in the mid-1880s, miners filed copper claims on the KP, working west and southwest of Jacob Lake. Around the year 1900, miners established Coconino City (now known as Ryan) near the mouth of Warm Springs Canyon as a smelter site serviced by a narrow-gauge railway, a flume, and a 4-inch wooden pipe to bring water from Big Springs (Billingsley et al. 1997). A steam-powered pumping plant and leaching plant were built in Warm Springs Canyon. Workers built a 100-ton blast furnace in the late 1920s, but fire soon destroyed the structure, ending the KP’s mining history. Ryan remains a significant location for exotics and unusual KP plant records.
Tourism

The first automobile arrived at the North Rim of Grand Canyon in 1909, but it was not until the late 1910s that a completed road to Bright Angel Point allowed automobiles to make it to the North Rim viewpoints on a regular basis. Several tourist concessionaires operated into the late 1920s, including Jimmy Owens at Harvey Meadow; “Blondie” Jensen, who operated from a cabin near the head of the Bright Angel Trail, perhaps located near Fuller Spring; Woolley, who had a cabin at Greenland Lake (Anderson 1998); and Elizabeth Wylie McKee, who operated an early concession at Bright Angel Point. Later, GRCA awarded a single concession contract, this to the Utah Parks Company (Verkamp 1993).

Visitation to the North Rim increased many-fold during the 1920s, with the area hosting as many as 7000 tourists by 1925 (Anderson 2000), justifying the construction of Jacob Lake Lodge in 1923 and the North Rim Lodge in 1927. During the late 1920s, GRCA started to build facilities to accommodate tourism, including the cabin above Kanabowmuts Spring in 1927, partly to exert a National Park Service (NPS) presence on newly acquired lands on the KP. By the 1930s, GRCA managed campgrounds at both Point Sublime and Cape Royal. Air service between V.T. Park just south of Kaibab Lodge and the South Rim was initiated in 1933.

No towns exist on the KP, but a resident summer population of approximately 250 (E. Davis, email communication, 21 March 2016) and a winter population of 4 GRCA employees live on the North Rim. Visitation to GRCA has increased over the years, from 14,500 visitors in 1926 to nearly 300,000 people per year during 2006–2015 (NPS 2016).

Grand Canyon National Park and U.S. Forest Service Administration

Holcomb (2009, 2010) synthesized the management history of the KP, contrasting that of the KNF with that of GRCA. In 1893, 23rd U.S. President Benjamin Harrison created the Grand Canyon Forest Reserve, including the KP and GRCA. Later, in 1906, 26th U.S. President Theodore Roosevelt created the Grand Canyon National Game Preserve, including much of what is now the KNF and GRCA north of the Colorado River. Still later, in 1908, he created Grand Canyon National Monument and the KNF. An act of Congress created GRCA in 1919, then transferred some KNF lands to the park in 1927 (Anderson 2000). The KNF plan (USDA 2014b) describes Frank’s Lake Geologic Botanic Area (Warren 1991a, 1991b) and the Pediocactus paradinei Conservation Area.

Civilian Conservation Corps

The Civilian Conservation Corps (CCC) arrived in 1933. Two hundred CCC men first camped at Neal Spring for 6 weeks, later moving to the vicinity of the present-day North Rim Campground, where they remained for 5 seasons before moving to CC Hill for another 2 seasons. They developed Greenland Lake and perhaps Hades Lake and 16 springs including Thompson, Greenland, possibly Tip-over, and others we visited during our fieldwork. They also built the northern boundary fence (presently out of service), Tiyo Point Road, and Kanabowmuts Lookout Tower, as well as removed thistles (probably native thistles since exotic thistles are rare within the park at present and were probably nonexistent then; Audretsch 2011).

Deer Irruption of the 1920s

Lessons in habitat carrying capacity and the role of predators were learned by land managers as events unfolded during a period of misguided management in the early 1900s (Leopold 1943, Freeman 1983, Dunlap 1988). Managers prohibited deer hunting with the creation of the Game Preserve in 1906, when the deer herd was estimated at 4000 animals (Rasmussen 1941). The government employed hunters to kill predators (Mann and Locke 1931), killing 816 mountain lions, 30 wolves, 7388 coyotes, and 863 bobcats (Rasmussen 1941) between 1906 and 1939. Deer numbers irrupted in the 1920s, with herd size estimated at 4000 animals (Rasmussen 1941). The government employed hunters to kill predators (Mann and Locke 1931), killing 816 mountain lions, 30 wolves, 7388 coyotes, and 863 bobcats (Rasmussen 1941) between 1906 and 1939. Deer numbers irrupted in the 1920s, with herd size estimated at 100,000 by 1924 (Rasmussen 1941). The deer stripped the land of vegetation, severely damaging the habitat and limiting its carrying capacity, causing deer to die by the thousands from malnutrition and disease. In response, managers implemented various schemes to reduce the deer herd, including an unsuccessful attempt by 125 herders to move deer south through the Grand Canyon across the Colorado River to the South Rim (Mann and Locke 1931). Government hunters killed 1124 deer over 10 days in December 1928 (Hodgin 1962).
The herd was reduced to 10,000 animals by 1939, which is close to present numbers. While scholars may argue about the lack of accurate data from this period, or that there may be other factors involved (Mann and Locke 1931, Russo 1964, Burk 1973, Dunlap 1988, Young 2002, Binkley et al. 2006), no one contests the effective predator removal program and subsequent irruption of deer populations. The Arizona Game and Fish Department estimates the Kaibab deer herd at 13,000 (June 2018) and plans to stabilize the population (McCall, Arizona Fish and Game Regional Game Manager, personal communication 2018).

Fire History

Forests of the KP have complex disturbance histories related to fire, fire suppression, logging, drought, insect outbreaks, microbursts, and windstorms (Holcomb 2009). Fire was an important management tool used by Paiute and other groups (Anderson 2006) on the KP. According to N. Adams, who lived in Kanab, Utah, in the late 1800s, “The smoke would be almost continuous from early spring until late autumn” (Ranger Ed Laws, Kanab, Utah, verbal communication 1934, as cited in McHenry 1935, p. 1). During this time, the Southern Paiute still occupied the Arizona Strip in their traditional manner.

Various researchers have studied aspects of fire ecology on the KP, as follows:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>White and Vankat</td>
<td>1993</td>
<td>Fire and white fir</td>
</tr>
<tr>
<td>Wolf and Mast</td>
<td>1998</td>
<td>Fire interval and elevation</td>
</tr>
<tr>
<td>Fulé et al.</td>
<td>2002</td>
<td>Pine density as related to fire history</td>
</tr>
<tr>
<td>Meigs</td>
<td>2004</td>
<td>Fire frequency over time</td>
</tr>
<tr>
<td>Fulé et al.</td>
<td>2004</td>
<td>Model of fire behavior</td>
</tr>
<tr>
<td>Binkley et al.</td>
<td>2006</td>
<td>Fire and aspen</td>
</tr>
<tr>
<td>Mast and Wolf</td>
<td>2006</td>
<td>Changes in dominants as related to fire regimes</td>
</tr>
<tr>
<td>Fulé and Laughlin</td>
<td>2007</td>
<td>Forest structure</td>
</tr>
<tr>
<td>Laughlin and Fulé</td>
<td>2008</td>
<td>Forest structure</td>
</tr>
<tr>
<td>McMaster et al.</td>
<td>2010</td>
<td>Warm Fire</td>
</tr>
<tr>
<td>Sesnie</td>
<td>2012</td>
<td>Tree basal area changes</td>
</tr>
</tbody>
</table>

The Warm and the Mangum fires have been the largest wildfires on the KP in recent history, burning 24,000 hectares (ha) and 28,915 ha in 2006 and 2020, respectively. Burned areas as a result of the Warm Fire are botanically diverse, with *Populus tremuloides*, *Quercus gambelii*, and *Robinia neomexicana* (New Mexican locust) dominating, and with many common understory plants including *Rosa woodsii* (Arizona rose), *Ceanothus fendleri* (buckbrush), *Phacelia heterophylla* (varileaf phacelia), *Geranium* spp. (Geranium), *Gnaphalium* spp. (cudweed), *Conyza* (horseweed), *Carex occidentalis* (western sedge), and *C. rossii* (Ross’ sedge). At Fire Point, along the east rim of the KP within GRCA, a fire resulted in an understory of increased annual and biennial forbs, with *Gayophyllum diffusum* (spreading groundsmoke), *Polygonum douglasii* (Douglas knotweed), *Chenopodium* spp. (goosefoot), *Solidago* spp. (goldenrod), *Elymus elymoides* (squirreltail), *Calochortus nuttallii* (sego-lily), *Hesperostipa comata* (needle and thread), and *Lotus* spp. (trefoil); these species are all indicative of areas influenced by recent fires (Laughlin et al. 2004).

In their 2010 Fire Management Plan, GRCA states that “restoration of fire to its natural role in park ecosystems is a priority for Grand Canyon National Park” (GRCA 2010). GRCA continues significant thinning and burning projects to reduce fuel loads (Rink personal observation). The updated KNF plan (USDA 2014a) and supporting material may be accessed at https://bit.ly/KaibabForestPlan.

Transportation

An average of ca. 100,000 vehicles enter GRCA at the North Rim every summer season (https://irma.nps.gov/Stats/Reports/Park/GRCA). Vehicles are a common vector for exotic plant introduction (Ansong 2016), so the amount of traffic is an indicator of the amount of potential exotic plant transfer. Arizona State Highways 89a and 67 traverse the study area from northwest of Jacob Lake to the south at Cape Royal. The road to Cape Royal was completed in 1931, while the modern alignment of Highway 67 was more or less complete by 1940. Within GRCA, the unpaved Point Sublime Road traverses from the main visitor services area west to Point Sublime, north to Big Spring Canyon, and west to Swamp Point, all within the study area. Other unpaved roads within GRCA are closed to motorized (wheeled) traffic, except for administrative use. In contrast to the few roads on GRCA, KNF has so many roads that it is virtually impossible to be farther than 1.6 km (1 mi) from a road.

Weed Management

The USFS evaluated the presence of noxious and invasive weeds on the KP (B.G. Phillips and Crisp 2004, USDA 2005), then
repeatedly applied herbicides to leafy spurge and other species on the NKRD. In 2014, GRCA vegetation management crews attempted (unsuccessfully) to eradicate native *Cirsium* spp. (thistles) at Cliff Spring in the belief that they were exotic. This incident reinforces the need for land managers and staff to work closely with botanists familiar with the region's flora.

**PREVIOUS FLORISTIC WORK**

Ellen Powell Thompson, sister of the well-known Colorado River explorer John Wesley Powell, may have collected plants on the KP (Smith 1994) but is known to have prepared and sent collections made by J.W. Powell's associates in the 1870s (Cronquist et al. 1972), which are now in the Gray Herbarium (GH). Marcus E. Jones, early western botanist, traveled over the KP in 1890 and made a few plant collections. He returned for a dedicated plant-collecting trip during 15–23 September 1894, and perhaps in July of 1923 (Lenz 1986). Jones's KP vouchers are deposited at several herbaria, including GH, Rancho Santa Ana Botanic Garden (RSA), and the Missouri Botanical Garden Herbarium (MO). Pauline Mead (Patraw), the first GRCA ranger-naturalist, described the ecology of the KP (Mead 1930) and was the first person to make large numbers of KP plant collections. Prior to the work reported herein, Rose Collom, the first paid GRCA botanist, collected 528 plant specimens from the KP portion of GRCA from the 1930s to the 1950s (Quartaroli 2011, SEINet 2010–2020). Inez Haring, mostly known for her work in the field of bryology, collected 123 specimens from the KP from 1940 to 1945. Early GRCA park naturalist John Merkle analyzed the spruce-fir community on the KP within GRCA (Merkle 1954, 1962) and collected 458 plant specimens from 1938 to 1962, the majority during 1951 and 1952. Forest Service botanist Leslie Goodding collected many specimens from the KP during 1948 and 1949, mostly from the KNF. Barbara Phillips, Zone Botanist on the KNF from 1990 to 2013, has been collecting plants on the KP since 1970. Melinda Hurst collected 284 specimens from the KP during 1976 and 1977. Crews from the Ecological Restoration Institute at Northern Arizona University collected 219 specimens from the KP during the period 1990–2007.


Various efforts have been made to compile lists of plants found in the region that includes the KP. Patraw (1932) prepared the first checklist of the plants occurring within GRCA, listing 450 species of plants, adding ca. 200 species a few years later (Patraw 1936). McDougall (1947) listed ca. 900 species of plants and presented a key to the plants of Grand Canyon (McDougall 1964), including those from the KP. The Phillips et al. (1987) annotated list of ca. 1400 species of plants for GRCA primarily reflects work done along the Colorado River in the 1970s and 1980s but also includes the KP. Brian (2000) designated species with special status at GRCA including the GRCA portion of the KP. Lori Makarick’s (14 March 2007) unpublished vascular plant checklist for GRCA includes 1784 botanical entities. There is no existing list of plants for the North Kaibab Ranger District.

Rare plant work is cited in Table 1.

**METHODS**

We compiled records of thousands of KP specimens from SEINet that are curated in
TABLE 2. Fieldwork dates and person hours, including the period 1983–2004, which was prior to the inception of our more directed efforts.

<table>
<thead>
<tr>
<th>Year</th>
<th>Dates</th>
<th>Person hours</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>23–25 June, 2–4 September</td>
<td>48</td>
<td>KNF</td>
</tr>
<tr>
<td>1990</td>
<td>6, 9 August</td>
<td>16</td>
<td>GRCA</td>
</tr>
<tr>
<td>1991</td>
<td>29 May</td>
<td>8</td>
<td>KNF, GRCA</td>
</tr>
<tr>
<td>1992</td>
<td>1 August</td>
<td>8</td>
<td>GRCA</td>
</tr>
<tr>
<td>1998</td>
<td>17 June</td>
<td>2</td>
<td>KNF</td>
</tr>
<tr>
<td>1999</td>
<td>2–3 September</td>
<td>16</td>
<td>GRCA</td>
</tr>
<tr>
<td>2001</td>
<td>31 August, 1 September</td>
<td>16</td>
<td>GRCA</td>
</tr>
<tr>
<td>2002</td>
<td>30–31 August</td>
<td>16</td>
<td>GRCA</td>
</tr>
<tr>
<td>2004</td>
<td>27–29 July</td>
<td>24</td>
<td>KNF</td>
</tr>
<tr>
<td>2007</td>
<td>4–8 July, 6–10 August</td>
<td>14,320</td>
<td>GRCA</td>
</tr>
<tr>
<td>2008</td>
<td>13–17 July, 4–8 August</td>
<td>60,200</td>
<td>GRCA</td>
</tr>
<tr>
<td>2009</td>
<td>13–17 July, 2–8 September</td>
<td>150,70</td>
<td>GRCA</td>
</tr>
<tr>
<td>2010</td>
<td>27 July–13 August</td>
<td>300</td>
<td>GRCA</td>
</tr>
<tr>
<td>2011</td>
<td>19–29 June, 2–5 September</td>
<td>200,40</td>
<td>Walhalla, GRCA, KNF</td>
</tr>
<tr>
<td>2012</td>
<td>13–18 June, 10–15 August</td>
<td>50,150</td>
<td>KNF</td>
</tr>
<tr>
<td>2013</td>
<td>17 August–1 September</td>
<td>100</td>
<td>KNF</td>
</tr>
<tr>
<td>2014</td>
<td>19 July</td>
<td>10</td>
<td>KNF</td>
</tr>
<tr>
<td>2015</td>
<td>13–16 June</td>
<td>40</td>
<td>KNF</td>
</tr>
</tbody>
</table>


In our collecting efforts, we visited 69 natural lakes (Appendix 2), 70 springs, including 4 not mapped on USGS quadrangles or otherwise known (Appendix 3), 16 cattle tanks (Appendix 4), and 36 natural sinks (Appendix 5). We focused on rim margins and areas below the rim that contain both mesic and xeric plants. We concentrated on undercollected families and plant groups not well represented in herbaria such as Cyperaceae, Juncaceae, Poaceae, and aquatics. We deposited our specimens primarily at ASC, DES, GRCA, MNA, and RM. Table 2 documents the intensity of our efforts.

Regional herbaria including Northern Arizona University (ASC), University of Arizona (ARIZ), Arizona State University (ASU), Desert Botanical Garden (DES), Grand Canyon National Park (GRCA), Museum of Northern Arizona (MNA), New York Botanical Garden (NY), Pacific Union College (PAC), University of Wyoming (RM), and Tonto National Forest (USFS–TEUI). We also searched smaller herbaria within Arizona that are not on SEINet, including Northern Arizona University at Yuma and the Coconino College Herbarium. We reviewed every specimen vouched in Appendix 1, and many where specimen determinations were suspect (due to their being the only record on the KP, well outside their known range, or in taxonomically difficult groups).

In our collecting efforts, we visited 69 natural lakes (Appendix 2), 70 springs, including 4 not mapped on USGS quadrangles or otherwise known (Appendix 3), 16 cattle tanks (Appendix 4), and 36 natural sinks (Appendix 5). We focused on rim margins and areas below the rim that contain both mesic and xeric plants. We concentrated on undercollected families and plant groups not well represented in herbaria such as Cyperaceae, Juncaceae, Poaceae, and aquatics. We deposited our specimens primarily at ASC, DES, GRCA, MNA, and RM. Table 2 documents the intensity of our efforts.


We followed the standards for floras as identified by Palmer et al. (1995), where appropriate. We used the abundance scale developed by Palmer et al. (1995) and followed the nomenclature of the Integrated Taxonomic Information System (ITIS 2007–2020; https://www.itis.gov), the U.S. Department of Agriculture Plants Database (USDA 2007–2020), the *Flora of North America* (FNA 1993–2016),
or the Angiosperm Phylogeny Website, Version 13 (http://www.mobot.org/MOBOT/research/APweb).

Results

At the inception of this study in 2007, we located 3357 vouchers of plants from just the GRCA portion of the KP at regional herbaria, including GRCA, MNA, ASC, DES, ARIZ, and ASU. At present, more than 10,000 herbarium specimens have been collected from both national forest and GRCA portions of the KP. We were unable to find Marcus E. Jones’s specimens. Searches at ILL (University of Illinois at Urbana–Champaign), US (Smithsonian Institution), and F (Field Museum of Natural History) have not revealed Pauline Mead’s vouchers. Until those specimens are data-based, it will be impractical to locate and verify their determinations. Two hundred and forty taxa either published in Phillips et al. (1987) or on SEINet were eliminated by reviewing specimens that were either misdetermined or mismapped (Appendix 6).

We collected over 900 specimens from 2007 through 2015. Appendix 1 is an annotated list of the vouchered taxonomic entities of the KP. Known vouchered specimens in our checklist include 86 families, 374 genera, 761 species, 7 subspecies, 20 varieties, and 4 hybrids—a total of 792 taxonomic entities. The 5 genera with the highest taxonomic diversity are Carex (23), Eriogonum (13), Bromus (13), Penstemon (13), and Astragalus (12). Despite our collecting efforts, the KP is still undercollected. For instance, 188 taxa documented for the KNF portion of the KP are undocumented for the KP in GRCA; and 140 taxa are documented for GRCA but not for the KNF on the KP. It seems likely that many taxa that are present in one jurisdiction, but absent in the other, are likely to be found with further searching.

Nonnative plants not previously published or recorded in SEINet in our list include 3 for Arizona, 1 for Coconino County, 1 for the KNF, 1 for GRCA, and 9 for the KP. Seventy-six of the vouchered taxa are introduced, including 4 horticultural introductions; 9.2% of the taxa in the checklist are introduced. Table 3 shows the number of new native taxa and new non-native entities for the various jurisdictions.

Because the majority of our time was spent collecting plants in GRCA and at the upper elevations of the KP, this plant list is most complete for those higher areas and GRCA, and less so for the lower ponderosa pine zone and the KNF. Twenty-six species in the checklist are included in the Arizona Natural Heritage Program Special Status Species Database (Table 1).

Twenty of 70 targeted springs and 31 of 69 targeted ponds were dry. Fuller, Neal, Tipover, Greenland, and Bright Angel springs, upon which early North Rim development depended, are presently dry or nearly dry. Forty-eight of the targeted wetland sites within GRCA were dry.

We found evidence of historic development at many springs we visited. Within GRCA, we found pipes or other water delivery systems showing historical use at Outlet, Robber’s Roost, Tipover, Greenland, Barrel, Upper and Lower Thompson, and 2 unnamed springs. Old corral remains at Kanabownits and Castle springs indicate historic livestock use of those areas. The remains of a cabin are evident at Kanabownits Spring.

Discussion

Eleven percent of KP taxa are exotic. For the KNF portion, 11.5% are exotic, while just 7.4% of the GRCA portion of this flora is exotic, a low percentage relative to other NPS areas on the southern Colorado Plateau (Rink 2003). Although other National Park Service inventory work in the region found many exotic species in disturbed and administrative sites (Rink 2005, Rink and Cully 2007, 2008, Rink et al. 2009), such was not the case on the KP portion of GRCA. Heavily used tourist areas on the North Rim of GRCA have few exotic and no purposefully planted exotic species, due to the vegetation management policies at GRCA.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>New native records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>4</td>
</tr>
<tr>
<td>Coconino County</td>
<td>9</td>
</tr>
<tr>
<td>Kaibab National Forest</td>
<td>10</td>
</tr>
<tr>
<td>Grand Canyon National Park</td>
<td>12</td>
</tr>
<tr>
<td>Kaibab Plateau</td>
<td>68</td>
</tr>
</tbody>
</table>

Table 3. Numbers of new records and numbers of those records that are nonnative for various jurisdictions within this project area.
We were able to document the invasion and vector for 2 species known from the region but not previously known for GRCA. A few individuals of *Phacelia alba* and *Mentzelia laevicaulis* were found at CC Hill and along the pathway from the North Rim Lodge to the campground, areas where GRCA construction crews had brought substrate in from Utah. Another mistake occurred when GRCA personnel attempted to eliminate a native thistle (*Cirsium* sp.) at Cliff Spring, having thought it to be an invasive species (see Land Use History section). In contrast, the KNF side of the KP is much weedier, probably due to its more intensive disturbance history. Gardens at Jacob Lake Lodge may be the source for *Chrysanthemum leucanthemum* invading along roadways.

We observed that many of the lakes of the KP are in the transitional stages of reverting to meadows (Rink personal observation). The first stage of this process is characterized by the presence of floating mats of vegetation in the center of the lakes, the mats surrounded by a ring (or moat) of clear water. In a few cases such as at Three Lakes, the mat has filled with soil and become an island. Most of the lakes have well-defined rings of vegetation. The most common vascular plants in the center mats are *Potamogeton*, *Sparganium*, *Glyceria*, and *Carex utriculata*. Close to shore in shallow water, one finds *Carex vesicaria*, *Callitriche*, *Eleocharis acicularis*, and *Glyceria*. *Callitriche*, *Galium trifidum*, *Alopecurus* spp., *Eleocharis acicularis*, and *Carex athrostachya* are on shore immediately adjacent to the lake. A few natural lakes and ponds on the KP have well-maintained fences capable of excluding cattle and bison.

Many plant species occur only at the margins of the KP; several are restricted to certain elevations, unable to grow at higher, colder climates. Other species only grow on cliffs, including those in the Kaibab Limestone, which on the KP occur primarily at rim edges that are at the margins of the plateau rim. Other taxa are present on the rims of the Grand Canyon, responding to weather conditions that include strong winds, heat rising from below, cold-air drainage, drier, hotter conditions on south-facing rims, and cooler, moister conditions on north-facing rims (Phillips et al. 1987, Stevens 2012).

The highest forested areas of the KP suffered a major die-off of subalpine fir during the 1990s. So many trees have fallen that it can be difficult to walk through these forests. In 2010, young subalpine fir trees 1–5 m tall dominated the understory of these areas (Rink personal observation).

**Recommendations**

The nonnative bison introduced to the KP severely impact the ecosystem of the KP (Reimondo et al. 2015), which harbors endemic plant and insect species (Stevens personal communication 2012). Unless controlled, bison will continue to increase in numbers, invade new areas, and spread their impacts throughout the KP as well as below the rim into the Grand Canyon.

Collaboration between the National Park Service, U.S. Forest Service, and knowledgeable botanists should continue to be encouraged, allowing for appropriate management options based on sound scientific information as it pertains to rare and introduced species. Such collaboration will decrease the risks of inadvertently and negatively affecting rare species and habitats. Soil substrates for construction should be limited to sources within GRCA, or at the least, within the KP, to avoid the possibility of inadvertently introducing seed sources of species not native to the KP.

**Acknowledgments**

We are indebted to Grand Canyon Conservancy Field Institute (known at the time as the GC Field Institute) participants Susan E. Ahearn, William C. Ahearn, Gary Bachman, Joanne Basta, Tom Bean, P. Douglas Folk, Michael Frank, Jerilee Grandy, Karen Grieg, Darroy M. Hanson, Joseph Hanson, Susan Lamb, Ann Litke, Kimberly Hansen, Celia A. Southwick, and Don Witter. They freely shared their energy and enthusiasm for learning the flora of the area and collecting plant specimens during our 5 field courses. Andrew Salywon, Ann Connolly, and Emily Palmquist also helped with plant collecting. Brad Wallace, Mike Bucheit, and Jack Pennington of the Grand Canyon Field Institute provided continuous and steady support by offering and arranging the North Rim Botany classes. Funding came from participants of Grand Canyon Field Institute courses (https://www.grandcanyon.org/classes-tours). We have drawn on the work of other modern collectors including
Walter Fertig, Max Licher, Kate Watters, Melissa McMaster, and others. The primary author conducted a portion of this work while employed by the Museum of Northern Arizona to evaluate springs, work that was funded by the KNF. Stephen Rice, GRCA hydrologist, shared ideas about springs and buffalo impacts, while Evan Reimondo and Michael Kearsley shared their discoveries of springs and sinks on the KP. Ariel Leonard and Michael Hannemann, both of the KNF, freely shared information about the KNF. Mike Anderson and John Azar provided invaluable information on the history of GRCA and KP, respectively. Katherine Callingham and Gael Gilliland assisted with the map illustration. Many thanks to Ed Gilbert for maintaining the online database SEINet, which facilitates this type of work. Colleen Hyde provided access to GRCA collections. Jenet Gillette and Kirstin Phillips provided access to MNA collections. Michelle McMahan, Philip Jenkins, George Ferguson, and Sarah Hunkins provided access to collections at ARIZ while Les Landrum, Walter Fertig, and Elizabeth Makings provided access to the collections at ASU. Andrew Salywon and Sarah Hunkins assisted in accessing specimens at DES. Burrell Nelson at RM was always responsive to our specimen requests. Tina Ayers, curator at Northern Arizona University (ASC), was a constant source of help and inspiration and a wonderful resource for the mayhem involved with specimen processing. Robert Mathiasen reviewed our Viscaceae. This research was conducted under several GRCA and USFS research permits. Thanks to Marc Baker, Walter Fertig, Les Landrum, Max Licher, Elizabeth Makings, and 2 anonymous reviewers for their detailed reviews of the manuscript.

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APPENDIX 1. Annotated checklist of vascular plants of the Kaibab Plateau, Coconino County, Arizona.

Taxa are arranged by phylum, with the phylum Magnoliophyta divided into classes Magnoliopsida and Liliopsida. Subsequent ranks are listed alphabetically. Family names are taken from the Angiosperm Phylogeny Group III (APGIII) classification system (Stevens 2001–present). Scientific names primarily follow the Flora of North America (FNA 1993–2016). In cases where species are not yet treated in the Flora of North America, other sources are used including the USDA Plants Database (USDA 2007–2020), the Integrated Taxonomic Information System (ITIS 2007–2020), or more current sources. We give synonyms for species published for the Kaibab Plateau under prior names, and in other cases for which including the synonymy would be helpful.

Annotation abbreviations: nKP = new record for the Kaibab Plateau (KP) with this work, from either herbarium review of existing specimens (with the result of an annotation to a previously unrecorded taxon for the KP) or our own collections; nC = new county record; nAZ = new state record; nGRCA = new GRCA record; native (N) vs. exotic (E) or both (B) (follows USDA). E* = species native to the region but introduced to the Kaibab Plateau, H = horticultural introduction (personal observation). Taxa considered to be new records are those not previously recorded (published or currently uploaded on SEINet) for the KP.

Abundance follows Palmer et al. (1995): 5, Abundant, dominant or codominant in one or more common habitats; 4, Frequent, easily seen or found in one or more common habitats but not dominant in any common habitat; 3, Occasional, widely scattered but not difficult to find; 2, Infrequent, difficult to find, with few individuals or colonies but found in several locations; 1, Rare, very difficult to find and limited to one or very few locations or uncommon habitats; 0, Absent, not found by the authors but found in a previous survey.

Distribution: G = Grand Canyon National Park, K = Kaibab National Forest, GK = both jurisdictions; habitat information and/or range; elevation. Elevations given reflect the elevations for which we have specimens and should not be considered the full range over which each species occurs on the KP.

Specimen citations include the collector, collector number (sn = without number, in cases with no collector number), herbarium acronym of the herbarium where the voucher is curated (Index Herbariorum [Their 2020]). We cited just one specimen voucher, though often species are vouchedered by several or more specimens. We conclude some taxon citations with notes.

LYCOPODIOPHYTA

Selaginellaceae

Selaginella watsonii Underwood, N, 2, GK, 2400–2600 m, subalpine, Rink 6627, ASC.

PTERIDOPHYTA

Aspleniaceae

Asplenium septentrionale (Linnaeus) Hoffmann, nKP, N, 1, G, rock crannies, Bobber’s Roost and Basin Springs, 2500–2520 m, Rink 7694, ASC.

Asplenium trichomanes Linnaeus, N, 1, G, rock crannies, R. Collom sn, ASU.

Dennstaedtiaceae

Pteridium aquilinum (Linnaeus) Kuhn, N, 3, GK, disturbed areas, 2430–2730 m, Halcerson 185, ASC.

Dryopteridaceae

Cystopteris fragilis (Linnaeus) Bernh., N, 2, GK, cracks in rocks, 2100–2670 m, Rink 4865, ASC.

FNA shows the range of C. fragilis further north, but our many vouchers refute this.

Cystopteris reeveiana Lellinger, N, 2, K, mesic sites, 2280–2550 m, Rink 7835, ASC.

Cystopteris tenuis (Michx.) Desv., N, 1, G, small meadow NE of Coffee Lake, 2510–2640 m, Rink 7535, ASC.

Cystopteris utahensis Windham & Hauffler, nKP, N, 1, G, Neal Spring, 2390 m, Rink 6566, ASC.

Determination by Windham.

Dryopteris filix-mas L., Schoh., N, 1, G, Kaibab Basin, 2500 m, Merkle 567, GRCA.

Polystichum louchitti (Michx.) Desv., nKP, N, 1, G, below east rim, 2360 m, Rink 6155, ASC.

Woodia oregana D.C. Eaton subsp. cathcartiana (B.L. Robbins.) Windham, N, 1, GK, 2100–2710 m, Rink 6439, ASC.

Ophioglossaceae

Botrychium pinnatum St. John, nKP, N, 1, GK, forests, 2610 m, Rink 7585, ASC.

Pteridaceae

Myriopteris gracilis Fee (Cheilanthes feei T. Moore), N, 2, GK, 2100–2410 m, cracks in dry cliffs, Rink 6559, ASC.

Pellaea glabella Mett. ex Kuhn, ASC.

Pellaea glabella Mett. ex Kuhn, ASC.

CONIFEROPHYTA

Cupressaceae

Juniperus communis Linnaeus, N, 4, GK, understory in subalpine forests, 2370–2750 m, Rink 6475b, ASC.

Juniperus osteosperma (Torr.) Little, N, 4, GK, rim edges and low areas, 2100–2320 m, Hodgson 15820, ASC.

Juniperus scopulorum Sarg., N, 4, GK, throughout, 2130–2690 m, Hodgson 7331, DES.
Pinaceae
Abies concolor (Gord. & Glend.) Lindl. ex Hildebr., N, 4, GK, subalpine forests, 2200–2690 m, Hodgson 7354, ASU.
Abies lasiocarpa (Hook.) Nuttall. N, 5, GK, subalpine forests, 2660–2720 m, Hodgson 18463, DES.
Picea engelmannii Parry ex Engelm., H, 5, GK, subalpine forests, 2660–2710 m, Hodgson 15981, DES.
Picea pungens Engelm., N, 4, GK, subalpine forests, 2440–2710 m, Hodgson 18432, DES.
Pinus edulis Engelm., N, 3, GK, rims and lower areas, 2100–2440 m, Rink 7979b, ASC. We followed Kral (1993) in differentiating P. edulis from P. monophylla by the expedient of number of needles per fascicle, two in P. edulis, one in P. monophylla. Species relationships are likely to be more complicated.
Pinus ponderosa P. & C. Lawson, N, 5, GK, throughout except the highest subalpine forests, 2100–2650 m, Hodgson 15925, DES.
Pseudotsuga menziesii (Mirbel) Franco, N, 5, GK, disturbed areas, 2100–2410 m, Goodding 9-48, ASC.
Atriplex patula Linnaeus, E, 1, K, Allen’s Riding Corral just south of Jacob Lake Lodge, 2410 m, Rink 12192, ASC.
Atriplex rosea Linnaeus, E, 1, K, Orderville Canyon, 2150 m, Goodding 45-248, ASC.
Chenopodium album Linnaeus, N, 2, GK, disturbed areas, 2130–2650 m, Rink 12194, ASC.
Chenopodium atrovirens Rydberg, N, 3, GK, throughout, 2310–2690 m, Rink 8069, ASC.
Chenopodium berlandieri Moq. var. zschackii (J. Murr) J. Murr ex Aschers., N, 2, GK, uncommon, 2400–2660 m, Rink 12257, DES.
Chenopodium capitatum (Linnaeus) Ambrosi var. parvicapitatum Welsh, N, 3, GK, throughout, 2130–2670 m, Goodding 76-48, ASC. Some specimens approach var. capitatum, particularly Rink 10901 from Moquitch Tank; most have a few vertical seeds mixed in the inflorescences.
Chenopodium fremontii S. Watson, N, 2, GK, throughout, 2130–2710 m, Rink 4503, ASC. Some specimens with acute leaves approach Chenopodium incanum.
Chenopodium incanum (S. Watson) A. Heller var. incanum, N, 2, K, Crazy Jug Point, 2270 m, Nelson 66973, RM.
Chenopodium incognitum Nuri Benet-Pierce, N, 1, K, Sanders 7343a, UCR.
Chenopodium leptophyllum (Moq.) Nuttall ex S. Watson, N, 1, GK, 2180–2710 m, Hodgson 15816, DES.
Chenopodium neomexicanum Standl., N, 2, GK, disturbed areas, 2100–2690 m, Rink 8974, ASC.
Chenopodium pratericola Rydberg, N, 1, G, 2380–2470 m, Hodgson 14734, ASC.
Chenopodium strictum A. Braun, nC, N?, 1, G, mixed conifer woodland, 2470 m, Hodgson 14734, ASC.
Dysphania graveolens (Willd.) Mosyakin & Cle- Dysphania graveolens (Willd.) Mosyakin & Cle- Dysphania graveolens (Willd.) Mosyakin & Cle- Dysphania graveolens (Willd.) Mosyakin & Cle-
Ephedra viridis Linnaeus, E, 1, K, along Hwy. 89, other disturbed areas, 2290 m, Rink 11643, ASC.
Krascheninnikovia lanata (Pursh) A. D.J. Meeuse & Smit, N, 2, K, lower areas, 2165 m, Mann M-93, RM.
Monolepis nuttalliana (J.A. Schultes) Greene, N, 2, K, Jacob Reservoir, 2130 m, Goodding 10-48, ASC.
Salvia parvula Ritz, E, 1, K, above Tater Springs, Hodgson 29145, DES.
Salvia tragus Linnaeus, E, 1, K, along Hwy. 89, 2290 m, Rink 11644, ASC.
Anacardiaceae
Rhus aromatica Aiton var. trilobata (Nuttall) Gray ex S. Wats., N, 3, K, low areas, 2170–2280 m, Rink 11376, ASC.

GNETOPHYTA

Equisetaceae
Equisetum arvense Linnaeus, N, 1, G, 2420 m, meadow at Kanabowits Spring, Collom sn, DES.
Equisetum × ferrisiis Clute (pro sp.), N, 1, G, 2530 m, Castle Lake, Rink 8792, ASC.
Equisetum hyemale Linnaeus var. affine (Engelm.) A.A. E., N, 2, GK, 2130–2500 m, wet places, Collom 1425, ASC.
Equisetum laeagatum A. Braun, N, 2, G, 2440–2530 m, high southern parts, Rink 7638, ASC.
Ephedra viridis Coville, N, 2, GK, rim edges and low areas, 2250–2310 m, Rink 6549, ASC.

MAGNOLIOPHYTA

Adoxaceae
(includes some Caprifoliaceae)
Sambucus nigra Linnaeus subsp. cerulea (Raf.) R. Bolli, N, 3, GK, throughout, 2100–2680 m, Go256-49, ARIZ.
Sambucus racemosa Linnaeus, N, 3, GK, throughout, 2260–2750 m, Go256-49, ASC.

Amaranthaceae
(includes Chenopodiaceae)
Amaranthus powellii S. Watson, N, 2, K, lower, disturbed areas, 2100–2410 m, Goodding 9-48, ASC.
**Apiaceae**

*Aletes macdougallii* Coult. & Rose subsp. *breviradiatus* Theobald & Tseng, N, 1, GK, rock faces, 2290–2710 m, *Rink* 6192, ASC.

*Angelica pinnata* S. Watson, N, 1, K, North Canyon & Big Springs Canyon, 2150 m, *Goodding* 384-48, ARIZ.

*Cicuta maculata* Linnaeus, N, 1, K, North & Big Springs Canyons, 2310–2470 m, *Goodding* 384-48, ASC. We follow the *Intermountain Flora* (Cronquist et al. 1997) interpretation that *C. douglasii* is not in AZ.

*Cymopterus purpureus* Linnaeus, N, 1, K, North & Big Springs Canyons, 2100–2710 m, *Rink* 4197, ASC.

*Lomatium foeniculaceum* (Nuttall) Coult. & Rose subsp. *macdougallii* (Coult. & Rose) Theobald, N, 3, GK, mostly common on the Walhalla Plateau, 2100–2470 m, *Rink* 4193, ASC.


*Lomatium nevadense* (S. Watson) Coult. & Rose, N, 2, G, Greenland Lake, 2440 m, *Collom* sn, ASU.

*Osmorhiza depauperata* Phil., N, 3, GK, throughout, 2100–2730 m, *Hodgson* 7322, DES.

*Perideridia parishii* (Coult. & Rose) A. Nelson & J.F. Macbr., N, 3, G, throughout, 2440–2590 m, *Collom* sn, ASC. We follow McDougal in calling all of our material *P. parishii*, rather than *P. gairdneri*, based on ternate rather than pinnate leaves.

*Pseudocymopterus montanus* (A. Gray) Coult. & Rose (*Cymopterus lemnosiferus* (J.M. Coult. & Rose) Dorn), N, 2, GK, subalpine forests, 2330–2760 m, *Goodding* 79-49, ASC.

*Pteryxia petraea* (M.E. Jones) Coult. & Rose (*Cymopterus petraeus* M.E. Jones), nKP, N, 1, G, below rim, 2290 m, *Rink* 6193, ASC.

**Apocynaceae**

(includes *Asclepiadaceae*)

*Apocynum androsaemifolium* Linnaeus, N, 2, GK, forested areas, 2100–2570 m, *Rink* 7885, ASC.

*Apocynum cannabinum* Linnaeus, nKP, N, 1, K, pine forests, 2100–2700 m, *Hodgson* 15904, DES.

*Asclepias asperula* (Decne.) Woodson subsp. *aspe-rula*, N, 2, GK, mostly pine forest, 2130–2500 m, *Hodgson* 11803, DES.

*Asclepias hallii* A. Gray, N, 1, K, Moquitch Canyon, 2540 m, *Fertig* 22188, NY.

*Asclepias latifolia* (Torr.) Raf., nKP, N, 1, G, below the rim, 2290 m, *Rink* 6196, ASC.

*Asclepias speciosa* Linnaeus, nKP, N, 1, K, pine forest, 2440–2490 m, *Rink* 11380, ASC.

*Asclepias subverticillata* (A. Gray) Val., N, 1, K, Big Springs Canyon and Pleasant Valley, 2100–2700 m, *Goodding* 121–48, ASC.

**Asteraceae**

*Achillea millefolium* Linnaeus var. *occidentalis* DC., N, 4, GK, throughout, 2100–2710 m, *Collom* sn, ASC.

*Acroptilon repens* (Linnaeus) DC. (*Centaurea repens* Linnaeus), E, 1, K, disturbed areas, 2440 m, *Higgins* 23407, UTC.

*Ageratina herbacea* (A. Gray) King & H.E. Robins, N, 2, GK, throughout, 2130–2590 m, *Goodding* 522-48, ARIZ.

*Agoseris aurantiaca* (Hook.) Greene, N, 3, GK, subalpine meadows, 2370–2750 m, *Hodgson* H-2559, DES. According to the FNA, *A. aurantiaca* should have no glands at the base of the involucre, but some specimens are both orange flowered and glandular, suggesting possible introgression between *A. aurantiaca* and *A. glauca* on the KP.

*Agoseris glauca* (Pursh) Rafinesque, N, 2, GK, mostly subalpine meadows, 2140–2750 m, *Rink* 5060, ASC. Distinctions between varieties *dasycephala* and *glauca* appear blurred on the KP.


*Ambrosia acanthacarpa* Hook., N, 1, K, Tater Spring waterfront, 2050 m, *Hodgson* 29140, DES.

*Ambrosia tomentosa* Nuttall, N, 1, K, Murray Lake, 2500 m, *Nelson* 70229, RM.

*Anaphalis margaritacea* (Linnaeus) Benth., N, 2, K, subalpine forests, 2420–2630 m, *Hodgson* 14765, DES.

*Antennaria marginata* Greene, N, 3, GK, forests throughout, 2130–2690 m, *Rink* 13267, ASC.

*Antennaria microphylla* Rydberg, N, 3, GK, forests throughout, 2330–2760 m, *Rink* 7517b, ASC. Includes specimens determined as *Antennaria rosea* Greene subsp. *arida* distinguished by the presence of glands beneath the stem tomentum, which seem indiscernable.

*Antennaria parviflora* Nuttall, N, 4, GK, forests throughout, 2250–2750 m, *Rink* 7993, ASC.

*Antennaria rosulata* Rydberg, N, 3, GK, subalpine meadows, 2400–2710 m, *Rink* 8033, ASC.

*Arctium minus* Bernh., E, 1, K, weedy places, 2130–2230 m, *Hodgson* 10978, DES.

*Arnica chamissonis* Lessing, N, 3, GK, subalpine lake margins, 2440–2760 m, *Rink* 8907, ASC.

*Arnica cordifolia* Hook., N, 3, GK, mostly subalpine meadows, 2500–2660 m, *Rink* 11328, ASC.

*Artemisia biennis* Willd., E*, 2, K, lake margins, 2350–2600 m, *Rink* 11468, ASC.

*Artemisia bigelovii* A. Gray, N, 4, GK, margins & rim edges, <2000 m, *Goodding* 424-48, ASC.

Centaurea stoebe Linnaeus, E, 2, GK, stock pond
Brickellia oblongifolia
Brickellia grandiflora
Chrysothamnus depressus Nuttall var. vaseyana (Rydberg) B. Boivin, N, 4, GK, mostly rim edges and lower areas, 2130–2260 m, Hodgson 5873, DES.
Balsamorhiza sagittata Wood ex Carruth, N, 4, GK, disturbed and rim areas, 2180–2500 m, Hodgson 2690, DES.
Brickellia californica (Torr. & A. Gray) A. Gray, N, 4, GK, rocky areas in pine forest, 2130–2500 m, Hodgson 2589, DES.
Brickellia eupatorioides (Linnaeus) Shinners var. chlorolepis (Woot. & Standl.) B.L. Turner, N, 2, K, pine forest, 2250 m, Rink 12243, ASC.
Brickellia grandiflora (Hook.) Nuttall, N, 3, GK, throughout, 2160–2600 m, Rink 4866, ASC.
Brickellia oblongifolia Nuttall var. linifolia (D.C. Eaton) B.L. Roberts, N, 1, K, Ryan, 1950 m, Goodding 294–49, DES.
Carduus nutans Linnaeus, E, 2, GK, stock pond along the AZ Trail south of Hwy. 89 and at Cliff Spring, 2370 m, Rink 12186, ASC.
Centarea stoebel Linnaeus subsp. micranthos (S.G. Gmelin ex Gugler) Hayek (Centarea maculosa nom. Lam.), E, 2, K, along Hwy. 67, 2570–2610 m, Nelson 66823, ASC.
Chenopodium douglasii (Hook.) Hook. & Arn., N, 2, GK, disturbed and rim areas, 2180–2500 m, Rink 10659b, ASC.
Chaetopappa ericoides (Torr.) Nesom, nKP, N, 1, G, rim margins, 2280 m, Rink 7970, ASC.
Chrysothamnus depressus Nuttall, N, 2, GK, margins, 2610–2670 m, Hodgson 5879, DES.
Chrysothamnus scopulorum (M.E. Jones) Urbatsch (Hesperodoria scopulorum (M.E. Jones) Greene), N, 2, G, within the canyon, 2100–2300 m, Rink 8943, ASC.
Chrysothamnus viscidiflorus (Hooker) Nuttall subsp. puberulus (D.C. Eaton) H.M. Hall and Clements, N, 1, K, LeFevre Ridge, 2130 m, Mann 123, RM. Likely more common than this one specimen would indicate.
Chrysothamnus viscidiflorus (Hooker) Nuttall subsp. viscidiflorus, N, 1, K, plateau margins, 2140–2590 m, Hodgson 15842, ASC.
Cirsium arizonicum (A. Gray) Petrak var. arizonicum (A. Gray) Keil (Cirsium nudulum (Jones) Petrak, N, 1, G, wet places, plateau margins, Cliff Spring and developed areas, 2130–2320 m, Hodgson 25702, DES.
Cirsium arizonicum (A. Gray) Petrak var. rothrockii (A. Gray) Keil, N, 2, K, 2030 m, Hodgson 15808, DES.
Cirsium cf. ryderbergii Petrak, N, 1, G, Cliff Spring, 2316 m, Rink 6551, ASC. Possible sp. nov.
Cirsium vulgaris (Savi) Ten., E, 2, GK, more common in the K, throughout, 2130–2590 m, Rink 10884, ASC.
Cirsium wheeleri (A. Gray) Petrak, N, 4, GK, 2110–2750 m, Goodding 321–48, ASC. The most common and widespread dryland thistle on the KP; specimens previously determined as C. undulatum and other species are now determined as C. wheeleri.
Conyza canadensis (Linnaeus) Cronquist, N, 3, K, along roadways, 2140–2540 m, Hodgson 11788, DES.
Crepis intermedia A. Gray, N, 3, GK, mostly in pine forests along rims, 2180–2490 m, Hodgson 2297, DES.
Crepis occidentalis Nuttall, N, 2, GK, pine forests, 2270–2490 m, Hodgson 26240, DES.
Dieteria bigelovii (A. Gray) D.R. Morgan & R.L. Hartman var. mucronata (Greene) D.R. Morgan & R.L. Hartman (Machaeranthera mucronata Greene, Pittonia 4(72): 1899; M. bigelovii (A. Gray) Greene var. mucronata (Greene) B.L. Turner), N, 3, GK, throughout, 2130–2750 m, Collom sn, ASC. A KP endemic, however, as described in the FNA, this entity approaches varieties of Dieteria canescens.
Dieteria canescens (Pursch) Nuttall var. ambigua (B.L. Turner) D.R. Morgan & R.L. Hartman (Machaeranthera canescens (Pursch) A. Gray var. ambigua B.L. Turner), N, 4, GK, mostly pine forests, 2070–2470 m, Rink 8031, ASC.
Dieteria canescens (Pursch) Nuttall var. aristata (Eastwood) D.R. Morgan & R.L. Hartman (Machaeranthera canescens (Pursch) A. Gray var. aristata (Eastwood) B.L. Turner), N, 2, GK, mostly pine forests, 2100–2600 m, Rink 7974, ASC.
Dieteria canescens (Pursch) Nuttall var. glabra (A. Gray) D.R. Morgan & R.L. Hartman (Machaeranthera canescens (Pursch) A. Gray var. glabra A. Gray, M. linearis Greene), N, 2, GK, 2190–2660 m, margins, Hodgson 6831, DES. The three varieties of Dieteria canescens intergrade on the KP.
Ericameria nauseosa (Pallas ex Pursch) G.L. Nesom & Baird var. graveolens (Nuttall) Reveil & Schuyler (Chrysothamnus nauseosus (Pallas ex Pursch) Britton subsp. graveolens (Nuttall) H.M. Hall & Clements; C. nauseosus var. graveolens (Nuttall) H.M. Hall), N, 2, GK, Cliff Spring and plateau margins, 2120–2590 m, Hodgson 25709, DES.
Ericameria parryi (A. Gray) G.L. Nesom & Baird var. nevadensis (A. Gray) Nesom & Baird (Chrysothamnus parryi (A. Gray) Greene
spp. nevadensis (A. Gray) H.M. Hall & Clem., *Chrysothamnus parryi* (A. Gray) Greene var. nevadensis (A. Gray) Kittell), N, 4, GK, throughout, 2110–2700 m, Hodgson 5904, DES.

*Erigeron canus* A. Gray, N, 2, K, pine forest, 2180–2490 m, McMaster 222, ASC.

*Erigeron concinnus* (Hook. & Arn.) Torr. & A. Gray var. concinnus, N, 1, GK, Little Park Lake & DeMotte Park, 2140–2680 m, Rink 6220, ASC.

*Erigeron diergensii* Terr. & A. Gray., N, 4, GK, throughout, 2110–2710 m, Rink 11575, ASC.

*Erigeron eatoni* A. Gray, N, 2, GK, throughout, 2190–2780 m, Rink 4190, ASC.

*Erigeron eximius* Greene, N, 2, GK, throughout, 2150–2690 m, Hodgson 7348, DES.

*Erigeron flagellaris* A. Gray, N, 4, GK, throughout, 2260–2740 m, Rink 8775, ASC.

*Erigeron formosissimus* Greene, N, 4, GK, throughout, 2130–2750 m, Goodding 80-48, ASC. We do not recognize varietal level on the KP.

*Erigeron speciosus* (Lindl.) DC., N, 4, GK, throughout, 2150–2750 m, Rink 6177, ASC. See note with *E. vreelandii*.

*Erigeron tracyi* D.C. Eat., N, 2, K, 2530–2670 m, Braem sn, ASC. Determination by Nesom.

*Erigeron vreelandii* Greene, N, 2, GK, throughout, 2300–2600 m, Fowler 4731, RMRS. *E. speciosus* and *E. vreelandii* seem to intergrade on the KP.

*Gaillardia pulchella* Foucí, H, 1, K, along Hwy. 67, 25200 m, Rink 12190, ASC.

*Gaillardia pinnatifida* Torr., N, 1, K, Big Springs, 2130 m, Mann 39, RM.

*Gaillardia pulchella* Foucí, H, 1, K, along Hwy. 67, 25200 m, Rink 12190, ASC.

*Grindelia squarrosa* (Pursh) Dunal var. serrulata (Rydberg) Steyermark, N, 4, K, weedy places, 2050–2350 m, Rink 11612, ASC.

*Gutierrezia microcephala* (DC.) A. Gray, N, 1, G, BA Pt., 2440 m, Collom sn, GRCA.

*Gutierrezia sarothrae* (Pursh) Shinners var. cinerea (Rydberg) Johnst. *Hymenoxys cooperi* (A. Gray) Cockerell, N, 2, K, pine forest margin, 2100–2300 m, Bierner 52356, UCR.

*Helianthemum parryi* A. Gray, N, 1, K, Warm Springs, Pettit 120, RMRS. This specimen could be a diminutive individual of *H. quinquenervis*.

*Helianthemum quinquenervis* (Hook.) A. Gray, N, 2, GK, throughout, 2230–2680 m, Goodding 333-48, ASC.

*Helianthus annuus* Linnaeus, N, 2, K, roadside, 2060–2130 m, Goodding 262-48, ASC. Many specimens previously determined as *Helianthus annuus* are *Helianthea quinquenervis*.

*Helianthus petiolaris* Nuttall, N, 1, K, roadside, 2060 m, Rink 11650, ASC.

*Heliothrix multiflora* Nuttall var. multiflora, N, 2, GK, throughout, 2100–2710 m, Goodding 47-48, ARIZ.

*Heliothrix multiflora* Nuttall var. nevadensis (A. Nelson) W.F. Yates, N, 4, GK, throughout, 2100–2590 m, Butterfield 301, ARIZ.

*Herrickia glauca* (Nuttall) Brouillet var. pulchra (S.F. Blake) Brouillet (Aster glaucodes S.F. Blake subsp. pulcher S.F. Blake), N, 2, G, wet plateau margins, 2220–2500 m, Rink 8951, ASC.

*Heterotheca fulcrata* (Greene) Shinners var. fulcrata, N, 2, GK, throughout, (2072) 2392–2652 m, Butterfield 269, ARIZ. Determination by Semple.

*Heterotheca villosa* (Pursh) Shinners var. minor (Hooker) Semple, N, 2, GK, throughout, 2200–2500 m, Goodding 203-48, ARIZ. Determination by Semple. We are not convinced that Semple’s varieties are worth considering. We have taken a conservative approach to *Heterotheca villosa* group taxonomy on the KP; not following Nesom (2006).

*Heterotheca villosa* (Pursh) Shinners var. nana (Gray) Semple, N, 2, GK, throughout, 2151–2470 m, Hodgson 15935, DES. See note with *H. v. var. minor*.

*Heterotheca villosa* (Pursh) Shinners var. pedunculata (Greene) Harms ex Semple, N, 2, GK, throughout, 2454–2670 m, Rink 7522, ASC. See note with *H. v. var. minor*.

*Heterotheca villosa* (Pursh) Shinners var. scabra (Eastwood) Semple, N, 1, K, lower elevations, 2133–2362 m, Goodding 14-48, ARIZ. Determination by Semple. See note with *H. v. var. minor*.

*Hieracium fendleri* Schultz-Bip., N, 3, GK, throughout, 2350–2750 m, Rink 9890, ASC.

*Hymenopappus filifolius* Hooker var. luginus Hooker, N, 2, GK, throughout, 2130–2440 m, Rink 4843, DES.

*Hymenopappus filifolius* Hooker var. nanus (Rydberg) B.L. Turner, N, 2, GK, throughout, 2130–2500 m, Rink 4843, ASC. We are uncertain whether our KP varieties are taxonomically distinct. If so, we may also have *H. filifolius* var. cinereus (Rydby) Johnst.

*Hymenoxys cooperi* (A. Gray) Cockerell, N, 2, K, pine forest margin, 2100–2300 m, Bierner 52356, UCR.

*Hymenoxys subintegra* Cockerell, N, 4, GK, throughout, 2120–2760 m, Goodding 25-48, ASC. This is the prevalent *Hymenoxys* on the KP, despite many misdeterminations.

*Isocoma pluriflora* (Torrey & A. Gray) Greene (Haplopappus heterophyllus (A. Gray) S.F. Blake; *H. pluriflorus* (Torrey & A. Gray) H.M. Hall; *Isocoma tregonii* (A. Gray) Rydberg), N, 1, G, Robber’s Roost, 2514 m, Colom sn, GRCA.

*Isocoma rusbyi* Greene, N, 1, G, Timp Point, 2130 m, Goodding 495-48, ARIZ.

*Iva axillaris* Nuttall, N, 2, K, weedy places, 2270–2450 m, Rink 9851, ASC.
Lactuca serriola Linnaeus, E, 4, GK, throughout, 2200–2690 m, Rink 6515, ASC.
Laennecia schiedeana (Less.) G.L. Nesom (Conyza schiedeana (Lessing) Cronquist), N, 4, GK, common in burned areas, 2460–2660 m, Rink 11556, ASC.
Layia glandulosa (Hook.) Hook. & Arn., N, 1, G, north of Greenland Point, 2450 m, Rink 10627, GRCA.
Leucanthemum vulgare Lam., E, 2, GK, roadsides, 2470–2800 m, Rink 10894, ASC.
Machaeranthera tanacetifolia (Kunth) Nees (A. Gray) A. Gray, Hodgson 2970, DES.
Madia glomerata Hook., N, 2, GK, mostly high meadows, 2160–2690 m, Rink 6422, ASC.
Matricaria discoidea DC., E, 1, GK, DeMotte Park and the old dump along the Point Sublime Rd, 2490–2660 m, Rink 6453, ASC.
Mulgedium pulchellum (Pursh) G. Don (Lactuca pulchella (Pursh) de Candolle; Haplopappus parryi A. Gray, Rink 6503, ASC."
Oreochrysum parryi (Nuttall) Greene var. graminea (Woot. & Standl.) S.L. Welsh, N, 4, GK, throughout, 2050–2590 m, Hodgson 28761, DES.
Petradoria pumila (Nutall) Greene var. pumila, N, 2, GK, throughout, 2050–2630 m, Hodgson 2594, NY.
Pleiacanthus spinosus (Nutall) Rydberg (Legeodesmia spinosa Nutall, Stephanomeria spinosa (Nutall) Tomb), N, 2, K, pine forests, 2140–2550 m, Rink 7872, ASC.
Pseudognaphalium macounii (Greene) Kartesz, N, 4, GK, disturbed areas, 2130–2730 m, Rink 7943, ASC.
Psilostrophe sparsiflora (A. Gray) A. Nelson, N, 1, K, plateau margin, 2130–2240 m, Hodgson 28812, DES.
Senecio eremophilus Richardson var. kingii Greenman, N, 4, GK, forests, 2360–2600 m, forests throughout, Goodding 375–48, ASC. Our specimens intergrade with S. eremophilus Richardson var. macdougalii (A. Heller) Cronquist.
Senecio flaccidus Lessing var. flaccidus, N, 1, G, Neal Spring, 2530 m, Collum sn, GRCA.
Senecio wootonii Greene, N, 2, G, 2430–2740 m, Theroux 126, MNA.
Solidago altissima Linnaeus, N, 2, GK, throughout, 2100–2660 m, Hodgson 15907, DES. See note under S. velutina.
Solidago multiadiata Ait., N, 3, GK, throughout, 2310–2750 m, Rink 11523, ASC.
Solidago nana Nuttall, N, 3, GK, meadows, 2100–2760 m, Goodding 223–48, ASC.
Solidago velutina DC., N, 3, GK, throughout, 2130–2680 m, Goodding 19–48, ARIZ. On the KP we cannot easily differentiate Solidago canadensis, S. altissima, S. missouriensis and S. velutina, as some specimens have lower leaves that are readily deciduous (a trait of S. altissima and S. canadensis) and leaves strongly reduced upward (a trait of S. velutina). Additionally, some specimens have pubescent inflorescences (a trait of S. canadensis) and entire leaves (a trait of S. missouriensis).
Sonchus asper (Linnaeus) Hill, E, 3, GK, disturbed areas throughout, 2160–2670 m, Rink 7524, ASC.
Stephanomeria exigua Nuttall, N, 1, K, pine forest, 2300 m, Boness sn, USFS–TEUI.
Stephanomeria minor (Hook.) Nuttall var. minor, N, 2, GK, rims, 2100–2550 m, Hodgson 2590, DES.
Stephanomeria thurberi A. Gray, N, 1, G, Cape Royal, 2350 m, Collum sn, GRCA.
Symphyotrichum ascendens (Lindl.) Nesom (Aster ascendens Lindley, A. chilensis Nees subsp. ascendens (Lindley) Cronquist), N, 2, GK, meadows, 2440–2690 m, Rink 8098, ASC.
Symphyotrichum falcatum (Lindl.) G.L. Nesom var. commutatum (Torr. & A. Gray) G.L. Nesom (A. commutatus (Torrrey & A. Gray) A. Gray, A. falcatus Lindley subsp. commutatus (Torrrey & A. Gray) A.G. Jones, A. falcatus var. commutatus (Torrrey & A. Gray) A.G. Jones, Symphyotrichum falcatum subsp. commutatum (Torrrey & A. Gray) Semple; S. falcatum var. commutatum (Torrrey & A. Gray) G.L. Nesom, Virgulus falcatus (Lindl.) Reveal & Keener), N, 4, GK, throughout, 2100–2500 m, Hodgson 11753, DES.
Symphyotrichum foliacum (DC.) G.L. Nesom (Aster foliacum Lindley ex de Candolle), N, 2, GK, meadows, 2400–2750 m, Rink 8012, ASC.
Symphyotrichum lanceolatum (Willd.) G.L. Nesom var. hesperium (A. Gray) G.L. Nesom (Aster hesperium A. Gray, A. lanceolatus Willdenow...
subsp. hesperius (A. Gray) Semple & Chmielewski, *Symphyotrichum hesperium* (A. Gray) A. Löve and D. Löve, N, 2, GK, 2130–2640 m, Rink 12249, ASC.

*Cryptantha cinerea* (Greene) Cronquist var. *cinerea*, N, 2, G, plateau margins, 2500 m, *Hodgsonia* 2283, DES.

*Cryptantha confertiflora* (Greene) Payson, nKP, N, 1, G, xeric places, 2270–2290 m, *Hodgsonia* 6264, DES.

*Cryptantha gracilis* Osterhout, nKP, N, 1, G, Naji Point, 2500 m, Rink 10661, GRCA.

*Cryptantha setosissima* (A. Gray) Payson, N, 4, GK, mostly open areas, 2150–2710 m, Rink 8049, ASC.

*Cryptantha torreyana* (A. Gray) Greene, nC, N, 1, G, Harvey Meadow, 2460–2490 m, Rink 7624, ASC.


*Betula occidentalis* Pursh, *Betulaceae*.

*Berberis fremontii* Torrey (Mahonia fremontii) Fedde, N, 1, K, plateau margins, 2030–2270 m, Nelson 66979, RM.

*Berberis repens* Lindl. (*Mahonia repens* (Lindley) G. Don), N, 4, GK, throughout, high slopes, 2110–2720 m, Rink 6467, ASC.

*Betulaceae*

*Betula occidentalis* Hook., N, 1, G, springs near the rim, 2310–2430 m, Rink 8952, ASC.

*Ostrya knowltonii* Coville, N, 2, G, steep shaded gullies below the rim, 2270–2320 m, Rink 6190, ASC.

*Brassicaceae*

*Ostrya* knowltonii (Linnaeus) Limnaeus, E, 1, GK, Pt Sublime and along Hwy. 67, 2270–2650 m, Rink 8879, ASC.

*Arabis hisruta* (Linnaeus) Scop., N, 2, G, 2100–2440 m, Rink 4861, ASU.

*Berteroa incana* (Linnaeus) DC., N, 1, K, Big Springs RS, 2130 m, Rink 12247, ASC.

*Boechera divaricarpa* (A. Nelson) A. Löve & D. Löve (*Arabis divaricarpa* A. Nelson), N, 1, GK, 2500–2670 m, Rink 6472, ASC.

*Brassicaceae* (includes *Hydrophyllaceae*)

*Chamaenerion angustifolium* (A. Nelson) Á. Löve & D. Löve, *Saxifragaceae*.

*Cryptantha cinerea* (Greene) Cronquist var. *cinerea*, N, 2, G, plateau margins, 2500 m, *Hodgsonia* 2283, DES.

*Cryptantha confertiflora* (Greene) Payson, nKP, N, 1, G, xeric places, 2270–2290 m, *Hodgsonia* 6264, DES.

*Cryptantha gracilis* Osterhout, nKP, N, 1, G, Naji Point, 2500 m, Rink 10661, GRCA.

*Cryptantha setosissima* (A. Gray) Payson, N, 4, GK, mostly open areas, 2150–2710 m, Rink 8049, ASC.

*Cryptantha torreyana* (A. Gray) Greene, nC, N, 1, G, Harvey Meadow, 2460–2490 m, Rink 7624, ASC.


*Betula occidentalis* Pursh, *Betulaceae*.

*Berberis fremontii* Torrey (Mahonia fremontii) Fedde, N, 1, K, plateau margins, 2030–2270 m, Nelson 66979, RM.

*Berberis repens* Lindl. (*Mahonia repens* (Lindley) G. Don), N, 4, GK, throughout, high slopes, 2110–2720 m, Rink 6467, ASC.

*Betulaceae*

*Betula occidentalis* Hook., N, 1, G, springs near the rim, 2310–2430 m, Rink 8952, ASC.

*Ostrya knowltonii* Coville, N, 2, G, steep shaded gullies below the rim, 2270–2320 m, Rink 6190, ASC.

*Brassicaceae*

*Ostrya* knowltonii (Linnaeus) Limnaeus, E, 1, GK, Pt Sublime and along Hwy. 67, 2270–2650 m, Rink 8879, ASC.

*Arabis hisruta* (Linnaeus) Scop., N, 2, G, 2100–2440 m, Rink 4861, ASU.

*Berteroa incana* (Linnaeus) DC., N, 1, K, Big Springs RS, 2130 m, Rink 12247, ASC.

*Boechera divaricarpa* (A. Nelson) A. Löve & D. Löve (*Arabis divaricarpa* A. Nelson), N, 1, GK, 2500–2670 m, Rink 6472, ASC.
Boechera fendleri (S. Watson) W.A. Weber (A. fendleri (S. Watson) Greene), N, 2, GK, pine forests, 2130–2650 m, Rink 9896, ASC.

Boechera gracilipes (Greene) Dorn (Arabis gracilipes Greene), N, 2, GK, pine forests, 2240–2470 m, Rink 8613, ASC.

Boechera pendulina (Greene) W.A. Weber (Arabis pendulina Greene), N, 1, K, pine forests, 2220–2300 m, Goodding 197-49 ASC.

Boechera perennans (S. Watson) W.A. Weber (Arabis perennans S. Watson), N, 1, GK, pine forests, 2130–2650 m, Rink 7101, ASC.

Boechera stricta (Graham) Al-Shehbaz (Turritis stricta Graham, A. drummondii A. Gray, B. drummondii (A. Gray) A. Löve & D. Löve, T drummondii (A. Gray) Lanell), N, 2, GK, high wet areas, forests, and meadows, 2330–2770 m, Rink 6210, GRCA.

Capsella bursa-pastoris (Linnaeus) Desv., nKP, E, 1, K, mostly subalpine forests, 2220–2470 m, Rink 9896; it could be an undescribed taxon.

Cardaria draba (Linnaeus) Desv., nKP, E, 1, K, Castle Springs, 2230 m, Rink 11307, ASC.

Caulanthus crassicaulis (Linnaeus) Desv., nKP, E, 1, K, Castle Springs, 2230 m, Rink 11307, ASC.

Descurainia californica (A. Gray) O.E. Schulz, N, 3, GK, mostly subalpine forests, 2040–2690 m, Rink 6198, ASC.

Descurainia incisa (Engelm.) Brit., subsp. incisa, N, 2, GK, pine forests, 2440–2470 m, Rink 11616, ASC.

Descurainia obtusa (Greene) O.E. Schulz, N, 2, G, rim edges, 2240 m, Rink 7967, ASC.

Descurainia pinnata (Walter) Brit., subsp. ochroleuca (Wooton) Deling, N, 2, GK, pine forest, 2130–2590 m, Hodgson 29095, DES.

Descurainia sophia (Linnaeus) Webb ex Prantl., E, 2, K, mostly pine forests, 2150–2470 m, Rink 11296, ASC.

Draba asperella Greene var. asperella, N, 1, G, Whally Plateau, 2340–2530 m, Crawford 2004-1, ASC.

Draba asperella Greene var. stelligera O.E. Schulz (D. asperella var. kaibabensis C.L. Hitchc.), N, 2, G, rocky pine forest, 2190–2650 m, Hodgson 15345, DES.

Draba aurea Vahl ex Hornem., nKP, N, 1, K, De Motte Park, 2650 m, Reeves 5661, ASU.

Draba rectiflora C.L. Hitchc., N, 2, K, mostly lakes and sinks, 2440–2610 m, Rink 6393, ASC.

Erysimum capitatum (Douglas ex Hook.) Greene var. purshii (Durand) Rollins, N, 3, GK, throughout, 2130–2730 m, Deaver 6216, ASC. Our specimens have four-angled fruits, and a few have three-forked trichomes on the lower leaves; varietal recognition may not be appropriate here.

Erysimum inconspicuum (S. Watson) MacMill., nKP, N, 1, K, pine forest, 2400 m, Rink 12183, ASC.

Erysimum repandum Linnaeus, E, 1, G, open areas, 2490–2560 m, Reif 10808, ASC.

Hesperidanthus linearifolius (A. Gray) Rydberg (Schoenocrambe linearifolia (A. Gray) Rollins, Thelypodiospis linearifolia (A. Gray) Al-Shehbaz), N, 2, GK, plateau margins, 2130–2450 m, Hodgson 26238, DES.

Lepidium appelianum Al-Shehbaz (Cardaria pubescens (C.A. Mey.) Jarmolenko), nC, E, 1, K, Castle Spring, 2190 m, Rink 10735, ASC.

Lepidium montanum Nuttall, N, 1, K, Jacob Lake, 2380 m, McCormick sn, ASC.

Lepidium virginicum Linnaeus var. menziesii (DC.) C.L. Hitchc., N, 1, LaFevre Ridge, 2320 m, Holmgren 4696, ASC.

Nasturtium officinale R. Br., E, 1, K, Big Spring, 2150 m, Stevens 324, ASC.

Noccaea fendleri (A. Gray) Holub subsp. glauca (A. Nelson) Al-Shehbaz & M. Koch, N, 2, GK, throughout, 2130–2750 m, Hodgson H2238, ASC.

Pennellia longifolia (Benth.) Rollins, N, 2, GK, throughout, 2130–2640 m, Goodding 88-48, ASC.

Pennellia micrantha (A. Gray) Nieuwland, N, 1, GK, subalpine forest, 2510–2750 m, Goodding 327-49, ASC.

Physaria arizonica (S. Watson) O’Kane & Al-Shehbaz (Lesquerella arizonica S. Watson), N, 2, K, pine forests, 2070–2470 m, Hodgson 11072, DES.

Physaria intermedia (S. Watson) O’Kane & Al-Shehbaz (Lesquerella intermedia (S. Watson) Heller), N, 1, K, pine forests, 2130 m, Rink 8883, DES.

Physaria kingii (S. Watson) O’Kane & Al-Shehbaz subsp. kaibabensis (Rollins) O’Kane (Lesquerella kaibabensis Rollins), N, 2, GK, the Basin, Pleasant Valley, 2480–2690 m, Goodding 165-49, ASC.

Physaria kingii (S. Watson) O’Kane & Al-Shehbaz subsp. latifolia (A. Nelson) O’Kane & Al-Shehbaz (Lesquerella latifolia A. Nelson), N, 1, K, northern KP, 2270–2380 m, Go200-49, ASC.

Physaria rectipes (Woot. & Standl.) O’Kane & Al-Shehbaz (Lesquerella rectipes Woot. & Standl.), N, 1, G, plateau margins, 2100–2270 m, Hodgson 29094, DES.

Rorippa curvipes Greene, N, 3, K, cattle tanks and lakes, 2280–2660 m, Goodding 304-48, ASC.

Rorippa palustris (Linnaeus) Besser, N, 1, K, Crane Lake, 2590 m, Oxford 655, ASU. Determination by Andrew Salywon, Arizona State Brassicaceae expert. This specimen has wavy margined leaves, which is not an attribute of R. palustris; it could be an undescribed taxon.

Rorippa sphaerocarpa (A. Gray) Brit., N, 1, K, Warm Springs Lake, 2350–2690 m, Rink 11665, ASC.
Rorippa sylvestris (Linnaeus) Bess., E, 1, K, lake-shores, 2270–2350 m, Fertig 22031, ASC.
Siapisnum altissimum Linnaeus, E, 2, GK, mostly plateau margins, 2100–2560 m, Rink 6524, GRCA.
Streptanthus cordatus Nuttall, N, 2, K, plateau margins, 2190–2380 m, Rhodes 9947, ASC.
Thelypodium wrightii A. Gray, nKP, N, 1, G, Point Sublime, 2270 m, Rink 5881, ASC.
Thlaspi arvensre Linnaeus, E, 1, K, Castle Springs/Ryan, 1900–2230 m, Rink 11297, ASC.
Turritis glabra Linnaeus (Arabis glabra (Linnaeus) Bernh.), N, 2, GK, wet places, 2100–2740 m, Rink 6582, ASC.
Cactaceae
Coryphantha missouriensis (Sweet) Britt. & Rose, N, 1, K, 5 miles north of Jacob Lake, 2180 m, Cazier B[1], ASC.
Coryphantha vivipara (Nuttall) Britt. & Rose, N, 2, GK, fringes, mostly Walhalla Plateau, 2220–2450 m, Hodgson 26233, DES.
Echinocereus coccineus Engelm. subsp. concinnus, N, 1, GK, fringes, mostly Walhalla Plateau, 2220–2560 m, Hodgson 26247, DES.
Echinocereus mojavensis (L.D. Benson) Parfitt, N, 2, GK, fringes, mostly Walhalla Plateau, 2100–2570 m, Hodgson 26226, DES.
Opuntia fragilis (Nuttall) Haw., nKP, N, 1, K, Moquitch Spring, 2170 m, Rink 11373, ASC.
Opuntia macroaurita Engelm., N, 1, GK, plateau margins, 2100–2340 m, Butterfield 562, ASU.
Opuntia phaeacantha Engelm., N, 2, GK, plateau margins, 2100–2430 m, Hodgson 7330, DES.
Opuntia pinkacea B.D. Parfitt, N, 2, GK, plateau margins, 2100–2410 m, Hodgson 26228, DES.
Pedioactus paradinei B.W. Benson, N, 1, K, east side, 2100–2200 m, Hodgson 29060, DES.
Campanulaceae
Campanula parryi A. Gray, N, 2, GK, meadows, 2400–2750 m, Goodding 362-48, ASC.
Cannabaceae
Humulus lupulus Linnaeus var. lupuloides E. Small., N, 2, GK, canyons/mesic areas, 2130–2670 m, Goodding 155-48, ARIZ.
Caprifoliaceae
Linnaea borealis Linnaeus, N, 2, GK, shaded subalpine forests, 2440–2860 m, Goodding 182-48, ASC.
Lonicera arizonica Rehd., nKP, N, 2, GK, shaded forests, 2320–2650 m, Rink 7507, ASC.
Symphoricarpos oreophilus A. Gray, N, 2, GK, throughout, 2130–2710 m, Rink 7966, ASC. Following the Intermountain Flora (Cronquist et al. 1984), ours would be variety parishii. Variation in vestiture of twigs and leaves does not coincide with variation in anther exsertion, leaf color, or venation. Symphoricarpos taxonomy is a mess in this region. Phillips et al. (1987) reported S. longiflorus and S. rotundifolius from the KP. We have found no compelling reason to split them.
Valeriana acutiloba Rydberg, nKP, N, 1, GK, Mangum and Greenland Springs, 2170–2440 m, Rink 6199, ASC.
Valeriana arizonica A. Gray, N, 2, GK, margins, 2360–2390 m, Rink 6183, ASC.
Valeriana edulis Nuttall ex Torr. & A. Gray, N, 2, GK, springs and meadows, 2390–2730 m, Rink 7576, ASC.
Caryophyllaceae
Arenaria lanuginosa (Michaux) Rohrbach subsp. saxosa (A. Gray) Zaruzcchi, R.L. Hartman & Rabeler (Arenaria confusa Rydb.), N, 3, GK, throughout, 2130–2770 m, Rink 6211, ASC.
Cerastium arvense Linnaeus, E, 2, GK, meadows, 2590–2670 m, Rink 10690, ASC.
Eremogone eastwoodiae (Rydberg) Ikonnikov var. adenophora (Kearney & Peebles) R.L. Hartman & Rabeler, N, 2, GK, mostly high meadows, 2250–2710 m, Rink 6534, ASC.
Eremogone fendleri (A. Gray) Ikonnikov, N, 3, GK, throughout, 2100–2760 m, Higgins 24876, ASC.
Most of our material would be variety porteri (Rydberg) N.H. Holmgren & P.K. Holmgren.
Minuartia macrantha (Rydberg) House (M. filiorum (Maguire) McNeill), N, 1, GK, open areas, 2330–2670 m, Turner 78-80, ARIZ.
Paronychia sessiliflora Nuttall, N, 2, GK, east rim, 2560–2720 m, Rink 10041, ASC.
Pseudostellaria jamesii (Torr.) W.A. Weber & R.L. Hartman, N, 2, GK, throughout, 2250–2690 m, Rink 4518, ASC.
Sagina saginoides (Linnaeus) Karst., N, 1, GK, Fawn and Lower Thompson Springs, 2520–2640 m, Rink 6357, ASC.
Silene latifolia Poir. subsp. alba (Miller) Greuter & Burdet, nKP, E, 1, GK, Joe’s Mud Hole, Union Pacific (North Rim) Lodge, 2500–2580 m, Rink 10904, ASC.
Silene menziesii Hook., nC, nGRCA, N, 1, G, Swamp Point, 2250 m, Rink 4813, GRCA.
Silene rectiramea B.L. Robins., nKP, N, 1, G, steep mesic slopes in canyon, 2270 m, Rink 4506, ASC. Specimen collected below the rim in Douglas-fir forest.
Silene scouleri Hook., N, 2, GK, throughout, 2130–2750 m, Goodding 97-48, ASC. According to FNA, only var. pringlei (S. Watson)
C.L. Hitchcock & Maguire occurs in Arizona. This variety is characterized by having nodding inflorescences; our KP specimens have erect inflorescences.

Silene cerecea S. Watson, N, 1, GK, burned pine forest and hanging gardens, 2290–2610 m, Rink 6191, ASC.

Spergularia rubra (Linnaeus) J. Presl & C. Presl., E, 2, GK, house at GRCA entrance station, Snipe Lake and south of Spring Canyon, 2610–2700 m, Rink 7538, ASC.

Stellaria longifolia Muhl. Ex Willd., N, 2, GK, probably more common, meadows, 2450 m, Rink 10008, DES.

Stellaria media (L.) Cyr., E, 1, G, Greenwood Lake, 2590 m, Collom sn, GRCA.

Stellaria umbellata Turcz. ex Kar. & Kir. (Stellaria gomonischa Boivin.), N, 2, GK, open areas, 2470–2750 m, Rink 7541, ASC.

Celastraceae

Paxistima myrsinites (Pursh) Raf., N, 3, GK, throughout, 2110–2590 m, Rink 6476b, ASC.

Cleomaceae

Peritoma serrulata (Pursh) DC. (Cleome serrulata Pursh), N, 1 K, Jacob Reservoir, 2130 m, Goodding 8748, ASC.

Convolvulaceae

Convolulus arvensis Linnaeus, E, 1, G, disturbed areas, 2470 m, Hodgson 14753, DES.

Cornaceae

Cornus sericea Linnaeus, N, 2, GK, throughout, 2250–2500 m, Rink 6476b, ASC.

Crassulaceae

Sedum lanceolatum Torr., N, 2, GK, cliffs and meadows, 2490–2650 m, Hodgson 26263, DES.

Elaeagnaceae

Shepherdia canadensis (Linnaeus) Nuttall, N, 2, GK, subalpine forests, 2320–2680 m, Goodding 176–48, ASC.

Shepherdia rotundifolia (Linnaeus) House, N, 2, GK, moist subalpine forests, 2280–2740 m, Rink 7511, ASC.

Elatine triandra (Linnaeus) Pax, N, 1, GK, moist subalpine forests, 2400–2590 m, Rink 7878, ASC.

Euphorbiaceae

Chamaesyce chaetocalyx (Boiss.) Woot. & Standl. var. chaetocalyx, N, 2, K, pine forests, 2180–2260 m, Hodgson 2290, DES.

Chamaesyce fendleri Torr. & A. Gray var. fendleri, N, 1, pine forests, 2130–2310 m, Rink 8886, ASC.

Chamaesyce serpyllifolia (Pers.) Small, nKP, N, 1, GK, disturbed areas, 2350–2370 m, Rink 8699, ASC.


Euphorbia esula Linnaeus, E, 1, K, Big Springs Ranger Station, 2130 m, A. Phillips 53, ASC.

Euphorbia incisa Engelm., N, 2 GK, 2400–2600 m, Collom sn, GRCA.

Euphorbia lurida Engelm., N, 2, GK, throughout, 2420–2620 m, Hurst 182, GRCA.

Euphorbia schizoloba Engelm. (E. incisa Engelm.), N, 2, G, rim margins, Collom sn, GRCA.

Fabaceae

Astragalus amphioxys A. Gray var. modestus Barneby, N, 1, G, plateau margins, 2220–2300 m, Rink 4195, ASC.

Astragalus calycosus Torr. ex S. Watson, N, 2, GK, pine forests, 2130–2290 m, Hodgson 29484, DES. Many plants at rim localities have a diminutive form suggestive of A. cremnophyllax Barneby.

Astragalus castaneiformis S. Watson, N, 3, GK, throughout, 2090–2730 m, Rink 10617, ASC.

Astragalus crennophyllaxis Barneby var. crennophylax, N, 2, Cape Final, 2400 m, Brian 95-168, GRCA.

Astragalus humistratus A. Gray var. humistratus (Bydberg) Barneby, N, 1, K, Jones sn, ARIZ. Marcus Jones’ 1890 collection from the Buckskin Mountains without definite locality is the only record we have of this taxon on the KP.

Astragalus humistratus var. tenerrimus (Bydberg) Barneby, N, 3, GK, throughout, 2240–2660 m, Rink 6406, ASC.

Astragalus kentrophyta A. Gray var. elatus S. Watson, N, 2, GK, throughout, 2100–2720 m, Gooding 38-48, ASC.

Astragalus lentiginosus Doug. ex Hooker var. diphysus (A. Gray) M.E. Jones (A. l. Douglas
Greene var. 

Lupinus hillii S. Wats. (Lupinus barbiger (Pursh) Rydberg, N, 2, K, Lupinus argenteus)

Lotus wrightii

Lotus utahensis

Lotus corniculatus

Medicago lupulina Linnaeus, E, 2, GK, throughout,

Medicago sativa (Linnaeus) Lam., E, 3, K,

Melilotus officinalis S. Watson var. des. 

Michx. ex Willd. var. S. Wats., N, 3, GK, throughout,

Lupinus palmeri

Cercis occidentalis

Astragalus oophorus S. Watson var. S. Watson var. 

Astragalus miser S. Wats., N, 3, GK, throughout,

Lupinus kingii

Astragalus lentiginosus 30

Pursh var. 48

GK, throughout, 2280–2690 m,

var. DES.

2300–2490 m,

ASC.

Lupinus hillii

Lupinus argenteus (Greene) Barneby, N, 1, GK, 2160–2470 m,

Lupinus hillii

Lupinus hillii

Cercis occidentalis Torr. ex A. Gray var. orbiculata (Greene) Tidestrom, N, 2, G, within the canyon, 2190–2270 m, Hodgson 6258, DES.

Dalea candida Michx. ex Willd. var. oligophylla (Torr.) Shimmers, N, 2, GK, northern margins, 2130–2440 m, Rink 12166, ASC.

Lathyrus laeticrensis Greene ex Rydberg, N, 2, GK, rim edges, 2300–2560 m, Hodgson 20305, DES.

Lotus corniculatus Linnaeus, E, 2, GK, at lakes and along roadways, 2390–2680 m, Rink 9924, ASC.

Lotus utahensis Ottley, N, 3, GK, throughout, 2130–2680 m, Rink 4516, ASC.

Lotus wrightii (A. Gray) Greene, N, 3, GK, throughout, 2100–2690 m, Rink 11585, ASC.

Lupinus argenteus Pursh subsp. argenteus, N, 3, GK, throughout, 2130–2650 m, Hodgson 2301, DES.

Lupinus barbiger S. Wats. (Lupinus sericeus Pursh var. barbiger (S. Watson) S.L. Welsh), N, 3, GK, throughout, 2280–2690 m, Goodding 319-48, ASC.

Lupinus hillii Greene var. hillii (Lupinus argenteus Pursh var. hillii (Greene) Barneby, L. h. var. osterhoutianus (C.P. Sm.) Harmon), N, 3, GK, throughout, 2100–2750 m, Goodwin 1089, ASC.

Lupinus kingii S. Wats., N, 3, GK, throughout, 2130–2600 m, Goodding 99-48, ASC.

Lupinus palmeri S. Wats., N, 3, GK, throughout, 2330–2660 m, Rink 11632, ASC.

Medicago lupulina Linnaeus, E, 3, GK, throughout, 2130–2600 m, Hodgson 14700, DES.

Medicago sativa Linnaeus, E, 2, GK, throughout, 2100–2710 m, Rink 5093, ASC. Within GRCA, only known from Vista Encantada, an east rim viewpoint.

Melilotus officinalis (Linnaeus) Lam., E, 3, K, throughout, 2130–2750 m, Rink 6650, ASC.

Oxytropis oreophila A. Gray var. oreophila, N, 2, K, open areas, 2280–2700 m, Goodding 324-48, ASC.

Psoralidium tenutiflorum (Pursh) Rydberg, N, 2, K, 2300–2490 m, Goodding 210-48, ASC.

Robinia neomexicana A. Gray, N, 4, GK, throughout, 2130–2710 m, Hodgson 15982, DES.

Trifolium andinum Nuttall, N, 1, G, plateau margins, 2310–2440 m, Collom sn, ASC.

Trifolium gymnocarpum Nuttall, N, 2, K, Jacob Reservoir, 2380 m, Rink 8911, ASC.

Trifolium hybridum Linnaeus, E, 2, GK, lakes, 2440–2690 m, Rink 10663, ASC.

Trifolium longipes Nuttall, N, 3, GK, mostly meadows, 2440–2690 m, Goodding 303-49, ASC.

Trifolium pinetorum Greene, N, 3, GK, mostly meadows, 2420–2690 m, Goodding 361-48, ASC.

Trifolium pratense Linnaeus, E, 1, K, south of Jacob Lake, 2560 m, Sanders 7322, UCR.

Trifolium repens Linnaeus, E, 3, GK, 2470–2710 m, Hodgson 14728, DES.

Fagaceae

Quercus arizonica Sarg., N, 1, G, Tiyo Point, 2370 m, J. & C. Merkle 752, GRCA.

Quercus gambelii Nuttall, N, 5, GK, throughout, 2160–2750 m, Hodgson 5906, DES.

Quercus turbinella Greene, N, 4, GK, slopes below rim, 2130 m, Goodding 493-48, ASC.

Quercus × paucloba, N, 2, G, below rim, 2270 m, Hodgson 6263, DES.

Caryaceae

Carya flavescens S. Watson, N, 2, GK, below rims, 2130–2440 m, Rink 7961, ASC.

Gentianaceae

Frasera speciosa Doug. ex Griseb., N, 2, GK, throughout, 2290–2750 m, Goodding 241-48, ASC.

Gentiana parryi Engelm., N, 2, GK, subalpine meadows, 2440–2760 m, Hodgson 14864, DES.

Gentianella amarella (Linnaeus) Boerner, N, 3, GK, throughout, 2270–2710 m, R18048, ASC. Varieties of Gentianella amarella on the KP are blurred, with individual plants exhibiting characteristics of both varieties acuta and heterosepala.

Geraniaceae

Erodium cicutarium (Linnaeus) L’Her. ex Ait., E, 1, GK, Big Springs RS/Kaibab Trail, 2130 m, Hodgson 15924, DES.

Geranium caespitosum James, N, 3, GK, throughout, 2130–2720 m, Rink 7570, ASC. Varieties of Geranium caespitosum are distinguished by glandular vestiture and appear to not be significant on the KP. See note under Geranium richardsonii.

Geranium richardsonii Fisch. & Trautv., N, 3, GK, throughout, 2130–2750 m, Goodding 376-48, ASC. In the Intermountain Flora, Geranium caespitosum and G. richardsonii are distinguished largely based on leaf size, shape of the leaf divisions, length of the sepal awns and often habitat (mesic vs. dry). I see complete gradation of these characters on the KP. One
end of the spectrum is occupied by plants short in stature, with buttoned stems, short sepal awns, strongly glandular sepal, and purple flowers. These are plants that botanists have usually called *G. richardsonii*. The other end of the spectrum is occupied by taller, lankier plants with fewer, more sprawling stems, longer sepal awns and either lacking glands on the sepal, or with fewer glands on the sepal, and white flowers. These plants, botanists have usually called *G. cespitosum*.

**Grossulariaceae**

*Ribes cereum* A. Gray, N, 1, K, Timp Point, 2130–2290 m, *Hydrangeaceae*

*R. c. var. cereum* (S. Watson) Heller, N, 2, G, 2420–2520 m, *G. nuda* (Pursh) Greene

*R. c. var. inebrians* (Lindley) C.L. Hitchcock, R. c. var. pedicillare A. Gray, *R. inebrians* Lindley), N, 3, GK, throughout, 2120–2780 m, *Deaver 6212, ASC.*

*R. inermes* Rydb var. inerme, N, 2, G, rim margins, 2560–2680 m, *Bailey sn.*

*R. leptanthum* A. Gray, N, 3, GK, throughout, 2320–2590 m, *Goodding 61-48, ARIZ.*

*R. quercetorum* Greene, N, 2, GK, lower forests, 2130–2320 m, *Goodding 61-48, ARIZ.*

*R. velutinum* Benth., N, 2, GK, plateau margins, 2170–2270 m, *Rink 8578, ASC.*

*R. viscossimsum* Pursh, N, 2, G, 2440–2640 m, *Rink 10093, ASC.*

**Hydrangeaceae**

*Fendlera rupicola* A. Gray, N, 1, K, Timp Point, 2130–2320 m, probably more common, *Rink 8878, ASC.*

*F. wrightii* Rink 10093, 2130–2290 m, *Deaver 6212, ASC.*

*Turner’s treatment has just a few localities in central Texas.*

*Fendlerella utahensis* (S. Watson) Keller, N, 2, G, rim edges, 2130–2440 m, *Rink 7979a, ASC.*

*Philadelphus microphyllus* A. Gray, N, 2, G, slopes, 2260–2690 m, *Hodgson 5587, ASC.*

**Hypericaceae**

*Hypericum anagalloides* Cham. & Schlcht., N, 2, G, pond margins and other wet places, 2440–2650 m, *Rink 6606, ASC.*

*Hypericum sconleri* Hook. N, 2, G, wet places, 2420–2520 m, *Collom 6, ASC.*

**Lamiaceae**

*Agastache pallidiflora* (Heller) Rydberg, N, 3, GK, throughout, 2340–2710 m, *Rink 6179, ASC.*

*Clinopodium vulgare* Linnaeus, nKP, N, 1, G, South Big Springs, 2320 m, *Rink 7891, ASC.*

*Dracoccephalum parviflorum* Nuttall, N, 2, G, wet areas, 2140–2750 m, *Rink 6488, ASC.*

*Hedeoma drummondii* Benth., N, 2, GK, plateau margins, 2170–2270 m, *Rink 8578, ASC.*

*H. oblongifolia* A. Heller, N, 2, K, 2100–2570 m, *Rink 11623a, ASC.*

*Marrubium vulgare* Linnaeus, E, 2, K, Big Springs RS, 2130–2300 m, *White sn, MNA.*

*Mentha arvensis* Linnaeus, N, 2, G, springs and lakes, 2330–2440 m, *Rink 8520, ASC.*

*Monardella glauca* Greene, N, 3, GK, wet places, 2110–2450 m, *Goodding 441-48, ASC.*

*Nepeta cataria* Linnaeus, E, 1, G, Castle Canyon, *Goodding 440-48, ASC.*

*Prunella vulgaris* Linnaeus, N, 2, GK, wet places, 2430–2690 m, *Goodding 221-48, ASC.*

*Scutellaria potosina* Brandegee var. *kaibabensis* S.L. Rhodes & T.J. Ayers, N, 1, K, east side, 2130–2610 m, *Hodgson 7334, DES.* Endemic to the lower east margin of the KP and nearby areas.

**Lentibulariaceae**

*Utricularia macrorhiza* Le Conte, N, 2, K, aquatic in lakes, 2280–2670 m, *Goodding 310-48, ASC.*

**Linaceae**

*Linum aristatum* Engelm., N, 1, K, dry forest, 2070–2490 m, *Hodgson 11807, DES.*

*Linum ausrale* Heller, N, 2, K, 2190–2610 m, *Rink 12163, ASC.*

*Linum lewisii* Pursh, N, 2, GK, throughout, 2100–2730 m, *Rink 7998, ASC.*

*Linum puberulum* (Engelm.) Heller, N, 1, K, 2290–2480 m, *Rink 11626, ASC.*

**Loasaceae**


*Mentzelia montana* (Davidson) Davidson, N, 1, K, 2255 m, disturbed margins, *Hodgson 2302, DES.*

*Mentzelia rusbyi* Woot. (M. nuda (Pursh) Greene var. *rusbyi* (Woot.) Harrington), N, 2, GK, Big Springs and Warm Springs canyons, Pt. Sublime, 2130–2350 m, *Goodding 122-48, ASC.*

**Malvaceae**

*Alcea rosea* Linnaeus, nKP, E, 1, K, Big Springs, 2110 m, *Rink 12252, MNA.*

*Iliamna grandiflora* (Rydberg) Wiggins, N, 2, G, forest, 2390 m, *Rink 8531, GRCA.*

*Malva neglecta* Wallr., E, 2, GK, disturbed areas, 2100–2490 m, *Rink 10730, ASC.*

*Sphaeralcea parvifolia* A. Nel., N, 2, K, disturbed areas, 2110–2180 m, *Rink 12157, ASC.*

**Montiaceae**

(species taken from Portulacaceae)

*Claytonia rosea* (Rydberg) R.J. Davis, N, 1, GK, west rim, 2300 m, *Rink 4196, ASC.*

*Lewisia pygmaea* (A. Gray) B.L. Robins., N, 2, GK, meadows, 2440–2700 m, *Goodding 308-49, ASC.*
Montia chamissoi (Lede. ex Spreng.) Greene, nKP, N, 1, G, Robber’s Roost and Milk Springs, 2510–2530 m, Rink 7690, ASC.

Oenothera longissima (Greene) Hershkovitz (Talinum confertiflorum Greene), N, 1, K, ridge north of Tater Springs, east side of the monoline, 2415 m, Hodgson 28673, DES.

Nyctaginaceae

Mirabilis decipiens (Standl.) Standl., N, 2, GK, throughout, 2130–2550 m, Rink 7884, ASC.

Mirabilis linearis (Pursh) Heimerl., N, 2, GK, throughout, 2100–2560 m, Hodgson 3284, DES.

Mirabilis oxybaphoides (Pursh) Heimerl., N, 2, GK, throughout, 2130–2250 m, Hodgson 3284, DES.

Nyctaginaceae

Mirabilis decipiens (Standl.) Standl., N, 2, GK, throughout, 2130–2550 m, Rink 7884, ASC.

Mirabilis linearis (Pursh) Heimerl., N, 2, GK, throughout, 2100–2560 m, Hodgson 3284, DES.

Mirabilis oxybaphoides (Pursh) Heimerl., N, 2, GK, throughout, 2130–2250 m, Hodgson 3284, DES.

Oleaceae

Fraxinus cuspidata Torr. subsp. macropetalata (Eastw.) Rehd., N, 1, G, below the rim, 2290 m, Rink 6194, ASC.

Onagraceae

Chamerion angustifolium (Linnaeus) Holub subsp. circumvagum (Mosquin) Hoch, ined., N, 2, GK, throughout, esp. burned areas, 2300–2480 m, Collom sn, ASC. Determination by Hoch.

Circaea alpina (Mosquin) Hoch, ined., N, 1, K, mesic, 2320–2370 m, Rink 9525-a, ASC.

Epilobium brachycarpum K. Presl., N, 3, GK, meadows, 2320–2520 m, Rink 11623b, ASC.

Epilobium ciliatum K. Presl., N, 3, GK, 2330–2380 m, ASC.

Epilobium helenium Hausskn., N, 2, GK, wet meadows, 2310–2680 m, Rink 7656, ASC.

Epilobium hormannii Reichenb., N, 2, K, wet meadows, 2520–2590 m, Rink 11493, ASC.

Epilobium saximontanum Hausskn., N, 2, GK, 2330–2780 m, Goodding 18-49, ASC.

Gayophytum decipiens F.H. Lewis and Szweyk., N, 2, G, Powell Plateau, Kaibab Basin, 2300–2500 m, Merkle 362, GRCA.

Gayophytum diffusum Torr. & A. Gray subsp. parviflorum F.H. Lewis & Szweykowski, N, 3, GK, throughout, 2130–2780 m, Goodding 109-49, ASC.

Gayophytum diffusum F.H. Lewis and Szweyk., N, 3, GK, throughout, 2130–2780 m, Goodding 109-49, ASC.

Oenothera caespitosa Nuttall subsp. marginata (Nuttall ex Hook. & Arn.) Munz, N, 1, GK, pine forests, 2130–2410 m, Rink 11378, ASC.

Oenothera coronopifolia Torr. & A. Gray., N, 1, K, Jacob Lake area, 2280–2410 m, Boness sn, USFS–TEUI.

Oenothera elata Kunth subsp. hirsutissima (A. Gray ex S. Wats.) Dietrich, N, 1, K, Big Springs area, Goodding 339-48, ARIZ.

Oenothera flavida (A. Nelson) Garrett, N, 2, GK, open areas, 2370–2700 m, Goodding 299-49, ASC.

Oenothera longissima Rydberg, N, 2, GK, roadsides, 2100–2480 m, Rink 6456, ASC.

Oenothera pallida Lindl., N, 2, K, disturbed areas, pine forests, 1900–2010 m, Hodgson 3285, DES.

Orobanchaceae

(includes many species formerly in Scrophulariaceae)

Castilleja applegatei Fern. subsp. martini (Abrams) Chuang & Heckard, N, 1, G, Point Sublime, Risk sn, GRCA.

Castilleja integrata A. Gray, N, 2, GK, 2100–2700 m, Pennell 21628, ARIZ.

Castilleja kaibabensis N. Holmgren, N, 2, GK, rocky limestone, usually in meadows, 2440–2750 m, Goodding 222-48, ARIZ.

Castilleja linearifolia Benth., N, 3, GK, throughout, 2100–2750 m, Rominger 1657, ASC.

Castilleja miniata Dougl. ex Hook., N, 3, GK, throughout, 2340–2750 m, Rink 6688, ASC.

Collinsia parviflora Lindl., N, 2, G, 2220–2660 m, Rink 4194, ASC.

Cordylanthus wrightii A. Gray subsp. kaibabensis T.I. Chuang & Heckard, N, 1, K, 2100–2200 m, low areas into P/J woodland, Fertig 21300, RM.

Orobanchaceae

(includes many species formerly in Scrophulariaceae)

Orthocarpus luteus Nuttall, N, 2, GK, plateau margins, 2100–2620 m, Rink 10662, ASC.

Orthocarpus lutescens Nuttall, N, 3, GK, meadows, 2200–2760 m, Rink 6445, ASC.

Orthocarpus purpureo-albus S. Watson, N, 3, GK, meadows, 2100–2730 m, Hodgson 18414, DES.

Pedicularis centranthera A. Gray, N, 3, GK, forests, 2220–2690 m, Rink 7103, ASC.

Papaveraceae

(includes Fumariaceae)

Argemone munita Dur. & Hilg. var. rotundata (Rydberg) Shimmers, N, 2, K, east side, 2100–2170 m, Hodgson 2270, DES.

Corydalis aurea subsp. occidentalis (Engelm. ex A. Gray) G.B. Ownbey, N, 1, K, usually in naturally disturbed areas, 2160–2660 m, Clifton 13553, PUA.

Phrymaceae

(includes species formerly in Scrophulariaceae)

Erythranthe guttata (DC.) G.L. Nesom (Minimus gattatus DC.), N, 1, K, North Canyon, 2290 m, Concow sn, ASC.

Erythranthe primuloides (Benth.) G.L. Nesom & N.S. Fraga (Minimus primuloides Benth.), N, 2, GK, springs and pond margins, 2500–2780 m, Rink 7708, ASC.

Erythranthe rubella (A. Gray) N.S. Fraga (Minimus rubellus A. Gray), N, 1, G, wet areas, 2560 m, Hodgson 2595, DES.

Erythranthe suksdorfii (A. Gray) N.S. Fraga (Minimus suksdorfi A. Gray), N, 1, G, conifer forest, Cape Royal Road, 2440 m, Hodgson 154, ASU.

Plantaginaceae

(includes species formerly in Scrophulariaceae and Callitrichaceae)

Callitriche heterophylla Pursh, N, 2, GK, lake margins, 2340–2690 m, Rink 8079, ASC.

Callitriche verna Linnaeus, N, 2, GK, lake margins, 2500–2760 m, Smith 653, ASU. Mixed specimens; in SEINet as Elatine triandra.
Linaria dalmatica (Linnaeus) P. Mill., E, 2, GK, throughout, 2310–2400 m, Rink 9911, ASC.

Penstemon barbatus (Cav.) Roth, N, 3, GK, throughout, 2130–2690 m, Contway sn, ASC.

Penstemon barbatus × pseudopatus N, 1, GK, 2450–2720 m, Rink 7673, ASC. This hybrid is noted by both Crosswhite (1965) and Cronquist et al. (1984, p. 428).

Penstemon eatonii A. Gray subsp. undosus (M.E. Jones) Keck., N, 2, GK, plateau margins, 2100–2200 m, Rink 4817, ASC.

Penstemon linarioides A. Gray var. coloradoensis (M. Nelson) C.C. Freeman, N, 2, GK, 2230–2400 m, Rink 4818, ASC.

Penstemon linarioides A. Gray var. sileri A. Gray, N, 3, GK, throughout, 2100–2490 m, Rink 7910, ASC.

Penstemon pachyphyllos A. Gray ex Rydberg var. congestus (M.E. Jones) N.H. Holmgren, N, 2, K, northern margins, 2100–2620 m, Rink 11375, ASC.

Penstemon palmeri A. Gray, N, 1, GK, disturbed places, 2380–2440 m, Rink 11381, ASC.

Penstemon pseudopatus (Crosswhite) N. Holmgren, N, 3, GK, throughout, 2120–2760 m, Goodding 349–48, ARIZ. This is the most common and widespread Penstemon on the KP.

Penstemon rostriflorus Kellogg, N, 3, GK, rim edges, 2130–2690 m, Rink 7909, ASC.

Penstemon rydbergii var. aggregatus (Pellenn) N. Holmgren, N, 2, GK, subalpine meadows, 2440–2750 m, Zola sn, ASC. We have mostly P. rydbergii var. aggregatus on the KP although some specimens have calyx segments that are somewhat erose and broadened distally (vs. usually long-caudate-tipped), approaching var. rydbergii.

Penstemon rydbergii A. Nelson var. rydbergii, N, 1, G, Little Park, 2660 m, Huisinga 2528, ASC.

Penstemon strictus Bentham., E*, 2, K, meadows, 2500–2690 m, Rink 10897, ASC. Introduced along KP highways.

Penstemon subglaber Rydb., E*, 1, K, roadside, 2635 m, Rink 10119, ASC. Introduced along KP highways.

Plantago argyrea Morris, nKP, N, 1, G, Neal Spring, 2390 m, Rink 6561, ASC.

Plantago eriopoda Torr., N, 2, GK, mesic places, 2650–2710 m, Rink 9895, ASC.

Plantago lanceolata Linnaeus, E, 2, K, disturbed areas, 2410–2600 m, Rink 10899, ASC.

Plantago major Linnaeus, E, 2, K, wet areas, 2280–2680 m, Goodding 249–48, ASC.

Plantago tweedyi A. Gray, N, 1, GK, 2420–2680 m, Rink 7549, ASC.

Veronica americana Schwein. ex Benth., N, 2, GK, springs, 2190–2530 m, Rink 10734, ASC.

Veronica peregrina Linnaeus subsp. xalapensis (Kunth) Pellenn, N, 2, GK, wet areas, 2280–2780 m, Rink 6332, ASC.

Veronica serpyllifolia Linnaeus var. humifusa (Dickson) Syme, N, 2, GK, wet areas, 2310–2690 m, Rink 6605, ASC.

Polemoniaceae

Collomia grandiflora Douglass. ex Lindl., N, 2, G, throughout, 2280–2640 m, Hodgson 209, ASU.

Collomia linearis Nuttall, N, 2, GK, throughout, 2310–2690 m, Rink 6517, ASC.

Gilia ophthalmoides Brand., N, 2, GK, 2370–2560 m, mostly rim edges, Rink 7971, ASC.

Ipomopsis aggregata (Pursh) V. Grant subsp. formosissima (Greene) Wherry, N, 3, GK, throughout, 2100–2690 m, Rink 7923, ASC.

Ipomopsis arizonica (Greene) Wherry, N, 2, GK, margins, 2370–2560 m, Rink 10045, ASC.

Ipomopsis longiflora (Torr.) V. Grant, N, 1, G, Cape Royal Road, probably a waif, Searl sn, GRCA.

Ipomopsis multiflora (Nuttall) V. Grant, N, 2, K, pine forest, 2530 m, Buol sn, ARIZ.

Ipomopsis tenuituba (Rydberg) V. Grant subsp. latiloba V.E. Grant & Wilken, N, 3, GK, meadows, 2150–2690 m, Rink 7540, ASC. The experts, Wilken and Porter (2005) and Wilken (in review) differentiate I. tenuituba, with tube lengths of 25–34 mm and lobes not conspicuously flecked, from I. macrosiphon (Kearney and Peebles) V.E. Grant and Wilken, with tube lengths of 33–42 mm and lobes with conspicuous dark purple flecks. Flower tube lengths of our specimens range from 20 to 45 mm long, with little to abundant flecking on the corolla lobes, which is not corollated with tube length, leading us to believe that I. macrosiphon and I. tenuituba are the same taxon on the KP or that on the KP we have introgression between the two, and perhaps I. aggregata. Wilken (in review) goes on to say that I. macrosiphon does not occur on the Kaibab Plateau. However he annotated specimens from the KP that fit his key and description as I. macrosiphon to I. tenuituba, leading to further confusion.

Phlox austromontana Coville (Phlox diffusa subsp. subcarinata Wherry), N, 3, GK, throughout, 2100–2750 m, Goodding 33–49, ASC.

Phlox gracilis (Dougl.) Greene (Microsteris gracilis (Hooker) Greene), N, 2, GK, plateau margins, 2330–2650 m, Hodgson 155, ASU.

Phlox longifolia Nuttall, N, 1, GK, 2270–2320 m, Fertig 21983, UTC.

Polygonaceae

Bistorta bistortoides (Pursh) Small (Polygonum bistortoides Pursh), N, 1, G, Milk Creek, 2490–2750 m, Rink 7654, ASC.

Eriogonum alatum Torr., N, 3, GK, throughout, 2100–2500 m, Rink 11464, ASC.

Eriogonum arcuatum Greene var. arcuatum (E. jamesii Bentham., misapplied), N, 3, GK, meadows and rims, 2150–2720 m, Rink 8080, ASC.
Eriogonum cernuum Nuttall, N, 2, K, plateau margins, 2100–2200 m, Hodgson II 2505, DES.
Eriogonum corymbosum Bentham var. corymbosum, N, 1, K, Warm Springs/Ryan, 2100 m, Thackery 569, ARIZ. Determination by Reveal.
Eriogonum corymbosum var. glutinosum (M.E. Jones) M.E. Jones, N, 2, GK, 2130–2410 m, Rink 8972, ASC.
Eriogonum heermannii Durand & Hilg. var. argenteum (M.E. Jones) Munz, nKP, N, 2, G, Naji Point/Dragon Overlook, 2410–2500 m, Rink 8894, ASC.
Eriogonum heracleoides Nuttall var. heracleoides, nAZ, E*, 1, K, along Hwy. 67, just south of Crane Lake, 2610 m, Rink 8088, ASC. Probably a human-caused introduction from Utah.
Eriogonum microthecum Nuttall var. laxiflorum Hook., N, 2, K, plateau margins, 2100–2260 m, Goodding 447-48, ASC.
Eriogonum microthecum Nuttall var. simpsonii (Benth.) Reveal, N, 2, GK, 2100–2450 m, Rink 6540, ASC.
Eriogonum racemosum Nuttall, N, 3, GK, throughout, 2100–2750 m, Rink 6501, ASC.
Eriogonum umbellatum Torr. var. subaridum S. Stokes, N, 2, GK, 2110–2610 m, Rink 8035, ASC.
Eriogonum wrightii Torr. ex Benth., N, 1, G, Pt. Sublime, 2270 m, Reveal 694, ARIZ.
Eriogonum zonis J.T. Howell var. cocineum J.T. Howell (E. racemosum Nuttall var. cocineum (J.T. Howell) S.L. Welsh), N, 1, G, Pt. Sublime, 2275 m, Phillips et al. 81–337, MNA.
Fallopia convolvulus (Linnaeus) Á. Löve (Polygonum convolvulus Linnaeus), E, 1, K, Oak and Warm Springs Canyons, 2120 m, Goodding 46-48, ASC.
Persicaria amphibia (Linnaeus) A. Gray, N, 2, GK, pond emergent, 2270–2650 m, Rink 8076, ASC.
Persicaria lapathifolia (Linnaeus) A. Gray, nKP, N, 1, K, Warm Springs Lake, 2350 m, Rink 11610, ASC.
Polygonum aviculare Linnaeus, E, 3, GK, mostly open areas, 2100–2600 m, Rink 8032, ASC.
Polygonum douglasii Greene, N, 2, GK, mostly meadows, 2310–2710 m, Goodding 236-48, ASC.
Polygonum polyanthemos Meisn. subsp. kelloggii (Greene) Hickman, N, 2, GK, meadows, 2410–2750 m, Rink 6165, ASC.
Polygonum sitchensis Small subsp. sitchensis Greene, N, 3, GK, throughout, 2130–2630 m, Goodding 22-48, ASC.
Rumex acetosella Linnaeus, E, 2, GK, meadows and ponds, 2510–2720 m, Hodgson 14854, DES.
Rumex crispus Linnaeus, nKP, E, 2, GK, springs and ponds, 2340–2580 m, Goodding 82-48, ASC.
Rumex patientia Linnaeus, E, 1, K, along AZ 67, 2500 m, Nelson 66534, RMRS.
Rumex salicifolius Weinn., N, 2, GK, meadows and ponds, 2270–2530 m, Rink 11456, ASC.
Rumex triangularealis (Danser) Rech. f., N, 2, GK, meadows, springs, and ponds, 2120–2630 m, Rink 8908, ASC.
Rumex utahensis Rech. f., N, 2, GK, lakes and springs, 2330–2670 m, Goodding 215-48, ASC. Prostrate to erect plants with narrow, entire leaves, tubercles lacking and with entire to undulate margins tepals that have been called Rumex californicum Meisn. are here determined as Rumex utahensis.

Portulaceae
Portulaca oleracea Linnaeus, N, 1, K, plateau margins, 2140–2280 m, Hodgson 28503, DES.

Primulaceae
Androsace occidentalis Pursh, N, 1, K, margins, various, 2200 m, Higgins 28486, UNM.
Androsace septentrionalis Linnaeus (A. s. var. glandulosa (Woot. & Standl.) St. John, A. s. var. puberulenta (Byd.) Knuth), N, 3, GK, throughout, 2150–2750 m, Rink 8043, ASC.
Dodecatheon alpinum (A. Gray) Greene, N, 2, GK, high meadows, 2670–2780 m, Rink 10614, ASC.
Primula spectuicola Rydberg (P. harveyellii Fern.), N, 1, G, Cliff Springs, 2500 m, Stevens 1424, ASC.

Ranunculaceae
Aconitum columbium Nuttall, N, 2, GK, throughout, 2310–2570 m, Rink 7906, ASC.
Actaea rubra (Ait.) Willd., N, 2, GK, steep slopes, 2310–2550 m, Rink 7893, ASC.
Aquilegia chrysantha A. Gray, N, 1, K, 2470–2710 m, Hodgson 18429, DES. All the specimens we have seen appear to be influenced by A. coerulea.
Aquilegia coerulescens E. James, N, 2, GK, throughout, 2560–2640 m, Goodding 305-49, ARIZ. Most KP specimens, based on stamen and spur length, agree with var. pinetorum (Tidestrom) Payson ex Kearney & Peebles; other KP specimens, based on these characters, suggest var. ochroleuca Hook., which is not known to occur within Arizona. Based on the variation we see, we suspect that these plants may be influenced by Aquilegia chrysantha.
Aquilegia desertorum (M.E. Jones) Cockerell ex Hell, N, 1, G, Uncle Jim Point, 2300 m, Habecker sn, GRCA.
Caltha leptosepala DC., N, 1, K, V.T. Park, 2660–2680 m, Rink 10615, ASC.
Ceratocephala testiculata (Crantz) Roth (Ranunculus testiculatus Crantz), E, 1, K, northern margin, 2100 m, Chamberland 1906, ARIZ.
Clematis columbiana (Nuttall) Torr. & A. Gray (C. pseudoalpina (Kuntze) Nels.), N, 2, GK, throughout, 2200–2690 m, Rink 4847, ASC.
Clematis hirsutissima Pursh var. hirsutissima, N, 1, GK, Pleasant Valley and near Basin Spring, 2480–2630 m, Hodgson 18545, DES.
Clematis ligusticifolia Nuttall, N, 2, GK, mesic areas, 2130–2500 m, Rink 6544, ASC.

Delphinium nuttallianum Pritz. ex Walp., N, 2, GK, throughout, 2130–2650 m, Rink 7709, ASC.

Myosurus apetalus Gay var. montanus (G.R. Campbell) Whittmore, N, 2, GK, lakes and meadows, 2640–2660 m, Rink 7571, ASC.

Myosurus minus Linnaeus, N, 2, G, Greenland Lake, 2530–2560 m, Merkle 522, GRCA.

Ranunculus cardiosphaera Hook., N, 3, GK, meadows, 2340–2750 m, Rink 6397, ASC.

Ranunculus cymbalaria Pursh., N, 2, GK, wet places, 2300–2760 m, Rink 10732, ASC.

Ranunculus flavula Linnaeus, N, 2, GK, sports and lake margins, 2520–2690 m, Rink 7515, ASC.

Ranunculus glaberrimus Hook. var. ellipticus (Greene) Greene (R. oreogenes Greene), N, 1, K, pine forests and meadows, 2530–2590 m, Hodgson 2262, ASU.

Ranunculus inamoenus Greene var. inamoenus, N, 2, GK, meadows, 2310–2670 m, Rink 11590, ASC.

Ranunculus uncinatus D. Don ex G. Don, N, 2, GK, meadows, 2520–2690 m, Rink 7569, ASC.

Thalictrum fendleri Engelm. ex A. Gray, N, 3, GK, forested slopes, 2130–2720 m, Hodgson 15973, DES.

**Rhamnaceae**

Ceanothus fendleri A. Gray, N, 3, GK, throughout, 2100–2680 m, Hodgson 25727, ASC.

Ceanothus martinii M.E. Jones, N, 2, G, rim edges, 2410–2450 m, Hodgson 14795, DES.

Ceanothus paniculatus Sessé and Mocinio ex A.P. DC. (C. Greggii A. Gray), N, 2, GK, plateau margins, 2130–2440 m, Hodgson 6260, DES.

**Rosaceae**

Amelanchier alnifolia (Nuttall) Nuttall ex M. Roemer, nKP, N, 2, G, mesic areas, 2100–2690 m, Rink 7913, ASC.

Amelanchier utahensis Koehne var. utahensis, N, 2, GK, plateau margins, 2100–2440 m, Peebles 13043, ARIZ.

Amelanchier utahensis var. coulteri (Standl.) Clokey, N, 1, G, Crescent Ridge/Cliff Springs, 2320–2440 m, Hodgson 25710, DES. All but the young twigs and leaves are glabrous in this variety.

Cercocarpus ledifolius Nuttall var. intricatus (S. Watson) M.E. Jones, N, 2, GK, rim edges, Hodgson 6265, DES.

Cercocarpus ledifolius Nuttall var. ledifolius, N, 2, G, rim edges, 2130–2490 m, Hodgson 26257, DES.

Cercocarpus montanus Raf., N, 2, K, plateau margins, 2130 m, Hodgson 6293, DES. Introgreses with C. ledifolius on the KP.

Chamaebatia millefolium (Torr.) Maxim., N, 2, GK, rim edges, 2100–2380 m, Hodgson H-2591, DES.

Drymocallis arizonica Rydberg (Drymocallis glandulosa (Lindley) Rydberg subsp. arizonica (Rydberg) Sojak, Potentilla glandulosa Lindley subsp. arizonica (Rydberg) D.D. Keck, P. macrodactyla Tidestrom), N, 2, G, springs and mesic meadows, 2380–2640 m, Rink 7640, ASC.

Fallugia paradoxa (D. Don) Endl. ex Torr., N, 2, G, plateau margins, 2130–2500 m, Rink 10657, DES.

Fragaria virginiana Duchesne subsp. glauca (S. Wats.) Studt., N, 2, GK, throughout, 2470–2660 m, Rink 7534, ASC.

Geum macrophyllum Willd. var. pericincium (Rydberg) Raup, N, 1, GK, mesic areas, 2250–2320 m, Rink 7905, ASC.

Holodesmus densusus (Nuttall ex Hook.) Heller, N, 2, GK, throughout, 2130–2710 m, Goodding 135-48, ARIZ.

Ivesia arizonica (Eastw. ex J.T. Howell) Ertter (Potentilla osterhoutii (A. Nels.) J.T. Howell), N, 2, G, steep cliffs below the rim, 2120–2530 m, Rink 4500, ASC.

Petrophytum caespitosum (Nuttall) Rydberg, N, 2, GK, cliffs, 2310–2320 m, Hodgson 5885, DES.

Physocarpus malvaceus (Greene) Kuntz, nC, N, 1, K, openings, 2100–2710 m, Hodgson 2227, ASU.

Potentilla biennis Greene, nKP, N, 1, GK, Swamp Ridge, 2230–2360 m, Rink 8767, ASC.

Potentilla crinita A. Gray, N, 3, GK, throughout, 2100–2720 m, Rink 6411, ASC. Potentilla crinita may grade with P. hippiana on the KP.

Potentilla hippiana Lehmann, N, 3, GK, throughout, 2280–2750 m, Rink 6433, ASC. See note under P. crinita.

Potentilla norvegica Linnaeus, N, 3, GK, mesic meadows, 2280–2730 m, Rink 6423, ASC.

Potentilla pensylvanica Linnaeus, N, 1, K, Ertter 2901, NY.

Potentilla pulcherrima Lehmann., nKP, N, 1, G, Thompson Canyon, 2640 m, Rink 7590, ASC.

Potentilla recta Linnaeus, E, 1, K, Pine Hollow, 2230 m, Fertig 22063, NY.

Potentilla subviscosa Greene, N, 2, K, 2530 m, Holmgren 11142, ASC.

Poterium sanguisorba Limnaeus (Sanguisorba minor Scop.), E, 1, K, disturbed sites, 2300–2700 m, Rink 10694, ASC.

Prunus virginiana Linnaeus, N, 1, K, fringes, 2130–2500 m, Goodding 385-48, ARIZ.

Purshia stansburiana (Torr.) Henrickson, N, 4, GK, throughout, 2100–2440 m, Hodgson 15590, DES.

Purshia tridentata (Pursh) DC., H*, 1, K, Cooper Ridge, McCulloch Mtn, ASC. According to specimen label, planted by the USFS.

Rosa woodsii Lindl. subsp. arizonica (Rydberg) W.H. Lewis & Ertter, N, 3, GK, throughout, 2100–2710 m, Rink 6547, ASC.
Rubus idaeus Linnaeus subsp. strigosus (Michx.) Focke., N, 3, GK, forested areas, 2310–2700 m, Rink 6354, ASC.
Rubus neomexicanus A. Gray, nKP, N, 1, G, mesic slopes, 2590 m, Rink 10644a, ARIZ.
Salix scouleriana Greene, N, 2, G, subalpine forests, 2530–2730 m, Rink 6514, ASC.

Rubiaceae

Galium aparine Linnaeus, N, 2, GK, mesic areas, 2310–2500 m, Rink 11355, ASC.
Galium bifolium S. Watson., N, 2, K, North Canyon, Greenland Lake, Walhalla Plateau, 2400–2620 m, Rink 10696, ASC.
Galium mexicanum Kunth., nKP, N, 1, G, Green Spring, 2470 m, Rink 6592, ASC.
Galium stellatum Kellogg, nKP, N, 1, G, Point Sublime, 2270 m, Rink 8889, ASC.

Saxifragaceae

Heuchera rubescens Torr. (H. r. var. versicolor (Greene) M.G. Stewart), N, 2, G, rocky slopes and cliffs, 2100–2560 m, Hodgson 7355, ASU.
Lithophragma tennellum Nuttall, N, 2, GK, plateau margins, 2300–2690 m, Hodgson 26237, DES.
Saxifraga rhomboidea Greene, N, 3, GK, mostly meadows, 2470–2750 m, Rink 8618, ASC.

Scrophulariaceae

(Genera previously found in Scrophulariaceae are now found in Phrymaceae, Plantaginaceae, and Orobanchaceae.)
Limosella aquatica Linnaeus, nKP, N, 1, G, Milk and Robber’s Roost Springs, 2510–2520 m, Rink 7653, ASC.
Verbasum thapsus Linnaeus, E, 2, GK, throughout, 2100–2600 m, Hodgson 15936, DES.

Solonaceae

Nicotiana attenuata Torr. ex S. Watts. N, 2, K, plateau margins, pinyon-juniper open woodland, 2130–2157 m, Hodgson 28820, DES.
Physalis hederifolia Gray var. fendleri, N, 2, G, 2250–2320 m, plateau margins, Rink 7949, ASC.
Physalis hederifolia Gray var. palmeri (A. Gray) C.L. Hitchc., N, 2, GK, plateau margins, 2100–2500 m, Rink 6542, ASC.
Solanum jamesii Torr., N, 2, K, pine forests, 2130–2140 m, Hodgson 28784, DES.
Solanum nigrum Linnaeus, N, 1, GK, disturbed areas, pine forests, 2160–2590 m, Rink 8955, ASC.
Solanum triflorum Nuttall, N, 1, GK, disturbed areas, 2170–2530 m, Hodgson 29104, ASC.

Urticaceae

Urtica dioica Linnaeus, N, 4, K, mesic margins, esp. prevalent in side canyons to Nail Canyon, 2100–2500 m, Rink 9934, ASC.

Verbenaceae

Verbena bracteata Lag. & Rodr., N, 3, GK, disturbed areas, 2100–2500 m, Rink 10030, ASC.
Verbena macdougalii Heller., N, 2, GK, disturbed areas, 2100–2690 m, Rink 6611, ASC.

Violaceae

Viola canadensis Linnaeus, N, 2, GK, throughout, 2310–2630 m, Rink 7619, ASC.
Viola nephrophylla Greene (V. arizonica Greene, V. nephrophylla var. arizonica (Greene) Kearney & Peebles, N, 1, G, throughout, 2310–2660 m, Rink 7648, ASC.

Viscaceae
Arceuthobium abietinum Engelm. ex Munz, N, 2, GK, parasitic on Abies concolor, 2500–2720 m, Mathiason 7595, ARIZ.

Arceuthobium douglasii (Engelm.) Hawksworth & Wiens, N, 2, K, parasitic on Picea spp., 2530–2650 m, Mathiason 2006-30, ASC.

Arceuthobium microcarpum (Engelm.) Hawksworth & Wiens, N, 2, K, parasitic on Pinus ponderosa, 2460–2680 m, Hodgson 18557, DES.

Arceuthobium vaginatum (Willd.) J. Fresl subsp. cryptopodum (Engelm.) Hawksworth & Wiens, N, 2, K, parasitic on Pinus ponderosa, 2300–2470 m, Rink 10676, ASC.

Phoradendron juniperinum Engelm. ex A. Gray., N, 1, K, probably G, parasitic on Juniperus spp., 2100–2270 m, Wright 524-48, DES.

MONOCOTELYDONOUS PLANTS
Agavaceae
Agave utahensis Engelm. subsp. kaibabensis (McKelvey) Gentry, N, 2, G, 2100–2380 m, rim margins, Hodgson 5877, DES.

Yucca baccata Torr., N, 1, G, plateau margins, 2240–2280 m, Hodgson 5878, DES.

Alismataceae
Alisma triviale Linnaeus (A. plantago-aquatica Linnaeus var. americum Schultes & Schultes), N, 1, GK, Swamp Lake, 2330–2500 m, Rink 8806, ASC.

Amaryllidaceae
Allium bisceptrum S. Watson var. palmeri (S. Watson) Cronquist, N, 2, GK, pine and oak forests, 2100–2320 m, Rink 4814a, ASC.

Allium macroptetalum Rydberg, N, 1, K, ponderosa forest, 2250 m, Hodgson 2300, DES.

Asparagaceae
Maianthemum racemosum (Linnaeus) Link, N, 2, GK, steep slopes, 2100–2680 m, Rink 6495, DES.

Maianthemum stellatum (Linnaeus) Link, N, 3, GK, throughout, 2280–2760 m, Hodgson 18448, DES.

Proseratex trachycarpa S. Watson, N, 2, GK, steep, shaded slopes, 2100–2680 m, Rink 6491, ASC.

Cyperaceae
Carex aquatilis Wahlénb., N, 1, K, Bear Lake, 2780 m, Rink 9974, ASC. Formerly thought to be more widespread on the KP due to mis-determinations.

Carex athrostachya Olney, N, 3, GK, lake margins, 2280–2730 m, Goodding 220-48, ARIZ.

Carex aurea Nuttall, nKP, N, 1, GK, grassy areas, Milk Creek, Big Springs, 2120–2520 m, Rink 7635, ASC.

Carex bellii Bailey, N, 2, GK, forest margins, 2470–2650 m, Rink 5037, ASC.

Carex curatorum Stacey, nKP, N, 1, G, hanging gardens in canyon, 2100 m, Rink 4852, ASC.

Carex douglasii Booth, N, 2, GK, open areas, 2320–2690 m, Goodding 180–49, ASC.

Carex duriuscula C.A. Mey, nKP, N, 2, K, pine forests, 2300–2400 m, Rink 12762, ASC.

Carex geophila Mackenzie, N, 2, G, rim edges, 2300–2470 m, Rink 10631, DES. Probably more common than the three collections indicate.

Carex microptera Mackenzie, N, 2, K, wet places throughout, 2310–2680 m, Rink 6205, ASC.

Carex nebrascensis Dewey, N, 3, GK, disturbed wet places, 2120–2680 m, Rink 7634, ASC.

Carex obtusa Lilj., nKP, N, 2, G, Widforss Trailhead, Walla Walla, probably more common, Rink 10767, ASC.

Carex occidentalis Bailey, N, 3, GK, dry areas in forests, 2150–2500 m, Goodding 49-48, ARIZ.

Carex oreocharhis Holm, N, 1, GK, subalpine meadows, 2590–2750 m, Fritts 69-12, ARIZ.

Carex pellito Muhl ex Willd., N, 3, GK, wet places throughout, 2150–2700 m, Goodding 138-48, ARIZ. Hybridization between Carex pellito and C. utriculata is indicated by specimens collected at Little Park Lake, Zola sn, ASU and Rink 6226, ASC.

Carex petasata Dewey, N, 3, GK, meadows, 2440–2730 m, Storm 275, RM.

Carex praegracilis W. Booth., N, 2, K, springs and subalpine meadows, 2120–2660 m, Licher 3147, ASC.

Carex rossii Booth, N, 3, GK, dry hillsides, 2370–2760 m, Rink 4812b, ASC.

Carex serrata Dewey, N, 4, GK, subalpine forests, 2050–2710 m, Korstian 94, RM & BRY. Often the dominant ground cover.

Carex sub fusca W. Booth, N, 3, GK, lakeshores, 2290–2710 m, Rink 6363, ARIZ.

Carex utriculata W. Booth, N, 4, GK, subalpine lakes, 2560–2780 m, Rink 6229, ASC. The dominant emergent aquatic in nearly every lake.

Carex calicica Dewey, N, 2, GK, mostly rim edges and pine forests, 2100–2500 m, Rink 10660, ASC.

Carex vesicaria Linnaeus, N, 3, GK, common in lakes, shoreward from C. utriculata, 2520–2700 m, Clifton 15353, PUA.

Carex wootonii Mackenzie, N, 2, GK, meadows, 2440–2780 m, Rink 7663, ASC.

Eleocharis acicularis (Linnaeus) Roemer & J.A. Schultes, N, 4, GK, lake margins, 2350–2760 m, Rink 6214, ASC.
**Iridaceae**

**Iris missouriensis** Nutt., N, 1, G, Neal Spring, 2490 m, Collon sn, GRCA.

**Sisyrinchium demissum** Greene, N, 2, GK, springs and meadows, 2500–2650 m, Rink 7692, ASC.

**Juncaceae**

**Juncus balticus** Willd. subsp. ater (Rydberg) Snogerup, N, 2, G, ponds and springs, 2500–2510 m, Rink 7617, ASC.

**Juncus hyfounus** Linnaeus, N, 1, G, Outlet Canyon, 2500 m, Rink 10016, GRCA.

**Juncus confusus** Wieg., N, 2, G, wet areas, 2370–2780 m, Goodding 2549–48, ARIZ.

**Juncus interior** Wieg., N, 2, G, wet areas, 2380–2550 m, Rink 8865, ASC.

**Juncus longistylis** Torr., N, 2, G, springs and wet meadows, 2450–2670 m, Rink 7643, ASC.

**Juncus nevadensis** S. Watson, N, 2, GK, meadows, springs, lake margins, 2650–2780 m, Goodding 216–48, ASC.

**Juncus saximontanus** A. Nelson, N, 3, GK, springs, 2310–2670 m, Rink 7709, ASC.

**Liliaceae**

**Calochortus ambiguus** (M.E. Jones) Ownbey, N, 2, GK, pine forest, 2130–2500 m, Rink 12763, ASC.

**Calochortus nuttallii** Torr. & A. Gray, N, 2, GK, 2130–2560 m, Christie 1485, ASC.

**Fritillaria atropupurea** Nuttall, N, 2, GK, mostly pine forests, 2100–2560 m, Rink 7110, GRCA.

**Melanthiaceae**

**Anticlea elegans** (Pursh) Rydberg (Zigadenus elegans Pursh), N, 2, GK, throughout, 2120–2680 m, Rink 6473, GRCA.

**Zigadenus vaginatus** (Rydberg) J.F. Macbr., N, 1, G, springs below the rim, 2100 m, ASC.

**Agrostidaceae**

**Calypso bulbosa** (Linnaeus) Oakes var. americana (R. Brown) Luhr, N, 1, G, forests, 2500–2750 m, Rink 7881, ASC.

**Corallorrhiza maculata** (Raf.) Raf., N, 2, GK, throughout, 2260–2630 m, Rink 8036, ASC.

**Corallorrhiza striata** Lindl., N, 1, GK, forests, 2100–2500 m, Rink 4870, ASC.

**Corallorrhiza visiteriana** Conrad, N, 1, K, Jacob Lake, 2700 m, Holmgren 11157, ASU.

**Epipactis gigantea** Doug. ex Hook., N, 1, G, Cliff Spring, 2320 m, Merkle 290, GRCA.

**Goodyera oblongifolia** Raf., N, 2, GK, forests, 2100–2600 m, Rink 10052, ASC.

**Platanthera sparsiflora** (S. Watson) Schlechter, nKP, N, 2, G, springs and mesic places on the west side, 2120–2320 m, Rink 7907, ASC.

**Spiranthes romanzoffiana** Cham., N, 2, GK, wet meadows, 2430–2750 m, Rink 6608, ASC.

**Poaceae**

**Achnatherum hymenoides** (Roemer & J.A. Schultes) Barkworth (Orzopsis hymenoides) (Roem. & Schult.) Ricker ex Piper, Stipa hymenoides Roemer & Schultes), N, 1, G, rim edges, 2080–2560 m, Rink 7955, ASC.

**Achnatherum lettermanii** (Vasey) Barkworth subsp. dorei (Barkworth & J. Maze) Barkworth, N, 3, GK, throughout, 2300–2700 m, Hodgson 14709, DES.

**Achnatherum nelsonii** subsp. nelsonii (Scribn.) Barkworth) Barkworth subsp. dorei (Barkworth & J. Maze) Barkworth, N, 3, GK, throughout, 2310–2700 m, Rink 7607, ASC.

**Achnatherum perplexum** Hoge and Barkworth, nC, N, 1, G, rim, 2510 m, Rink 6394, ASC.

**Achnatherum speciosum** (Trin. & Rupr.) Barkworth, nKP, N, 2, GK, rim edges, 2300–2700 m, Rink 8873, ASC.

**Agropyron desertorum** (Fisch. ex Link) J.A. Schultes, E, 2, K, throughout, 2100–2680 m, Hodgson 15927, DES.

**Agrostis exarata** Trin., N, 2, GK, throughout, 2190–2680 m, Christie 1584, ASC.

**Agrostis gigantea** Roth, E, 1, GK, meadows, probably more common than the few records would indicate, 2380–2660 m, Goodding 213–48, ASC.

**Agrostis scabra** Willd., N, 3, GK, throughout, 2280–2720 m, Rink 6356, ASC.

**Agrostis stolonifera** Lam., N, 3, GK, throughout, 2370–2690 m, Darrow 2918, ARIZ.

**Alopecurus aequalis** Hack., N, 1, G, unknown, 2370–2690 m, Darrow 2918, ARIZ.

**Alopecurus eaequalis** Sobol. var. eaequalis, N, 3, GK, lake margins, 2360–2680 m, Rink 7582, ASC.

**Alopecurus geniculatus** Linnaeus, N, 3, GK, lake margins, 2440–2680 m, Rink 7684, ASC.

**Alopecurus pratensis** Linnaeus, E, 1, K, near Mud Lake, 2470 m, Higgins 25719, Dixie College.

**Andropogon hallii** Hack., N, 1, G, unknown, 2377 m, Seager sn, GRCA.

**Aristida purpurea** Nuttall var. fendleriana (Steu.) Vasey, N, 1, K, Timp Point, 2130 m, Goodding 498–48, ASC.

**Arrhenatherum elatius** (Linnaeus) Beauv. ex J.& K. Presl, E, 1, K, Big Springs, 2130 m, White sn, MNA.

**Axena fatta** Linnaeus, E, 1, G, Greenland Lake, 2550 m, Collum sn, GRCA.
Beckmannia syzigachne (Steud.) Fern., N, 2, G, vicinity of Neal and Thompson springs and Greenland Lake, 2380–2590 m, Rink 6387, DES.

Bleharonneuron tricholepis (Torr.) Nash., N, 4, GK, mostly meadows, 2130–2720 m, Rink 7886, ASC.

Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths, N, 4, GK, throughout, 2100–2600 m, Rink 6421, ASC.

Bromus carinatus Hook. & Arn. var. marginatus (Nees) Barkworth & Anderson, N, 1, G, 2330 m, Reif 10799, ASC.

Bromus catharticus Vahl, E, 1, K, Jacob Reservoir/ below Tater Spring, 2130–2260 m, Goodding 114-48, ASC.

Bromus ciliatus Linnaeus, E, 3, GK, meadows, 2100–2720 m, Rink 7599, ASC. Minor differences in vestiture on glumes and lemmas separate B. ciliatus, B. porteri, and B. richardsonii. Perhaps they should be considered varieties.

Bromus diandrus Roth subsp. rigidus (Roth) Lainz, E, 1, G, Harvey Meadow, 2560 m, Hurst 274, GRCA.

Bromus frondosus (Shear) Woot. & Standl., N, 2, E, 4, GK, throughout, 2130–2720 m, 2290 m, Road, B. ciliatus. See note under C. neglecta.

Bromus inermis (Link) Gould ex Shinners, E, 4, GK, throughout, 2100–2710 m, Rink 7625, ASC.

Bromus lanatipes (Shear) Rydberg, N, 1, GK, Walhalla Plateau, Sokolo sn, GRCA.

Bromus polyanthus Scribn., N, 1, G, Kanabovnikts Spring meadow, 2410 m, Reichardt KR 76, ARIZ.

Bromus porteri (J.M. Coulth.) Nash, N, 2, GK, throughout, 2370–2710 m, Rink 11637, ASC. See note under B. ciliatus.

Bromus richardsonii Nash. ex J.G. Sm., N, 2, K, margins, Goodding 446-48, ASC.

Bromus rubens (Torr.) Nash., N, 4, GK, throughout, 2100–2560 m, Goodding 85-48, ASC.

Bromus sterilis Linnaeus, E, 1, G, upper BA Trail, 2290 m, Rink 7191, ASC.

Bromus tectorum Linnaeus, E, 2, GK, throughout, 2100–2560 m, Goodding 85-48, ASC.

Calamagrostis scopulorum M.E. Jones, N, 1, G, Cliff Spring, 2310 m, Rink 6543, ASC. Some of our plants have intermediate characters between this and the following.

Calamagrostis stricta (Timm.) Koeler subsp. inexpecta (A. Gray) C.W. Greene, N, 1, K, Bear Lake, 2770 m, Stevens 1180, ASC. We are not completely satisfied with this determination as the ligules are truncate and ciliate on this specimen rather than long-pointed, which would be characteristic of C. stricta subsp. stricta.

Calamagrostis stricta (Timm.) Koeler subsp. stricta (C. neglecta (Ehrh.) Gaertn.), N, 1, G, Kaibab Basin, 2470 m, Merkle 351, GRCA.

Cinna latifolia (Trev. ex Goepp.) Griseb., N, 1, K, North Canyon, 2380–2440 m, Rink 11351, ASC.

Dactylis glomerata Linnaeus, E, 3, GK, throughout, 2080–2720 m, Rink 6381, ASC.

Danthonia californica Boland, N, 1, G, Hades Lake/Robber’s Roost Spring/Swamp Point, 2480–2570 m, Rink 7681, ASC.

Danthonia intermedia Vasey, N, 2, GK, openings in mixed conifer forest, 2560–2760 m, Rink 9967, ASC.

Deschampsia caespitosa (Linnaeus) Beauv., N, 3, GK, upper-elevation meadows, 2490–2750 m, Rink 6441, ASC.

Deschampsia elongata (Hook.) Munro., N, 1, G, upper-elevation meadows, Robber’s Roost, 2530 m, Merkle 244, GRCA.

Elymus elymoides (Raf.) Swezey subsp. brevifolius (J.G. Sm.) Barkworth, N, 3, GK, throughout, 2100–2720 m, Rink 7670, ASC.

Elymus glaucus Buckl., N, 3, GK, throughout, 2150–2740 m, Rink 7604, ASC.

Elymus lanceolatus (Scribn. and J.G. Sm.) Gould subsp. lanceolatus (Scrib.) & J.G. Gould, N, 1, K, Crane Lake, Darow 2920, MNA.

Elymus lanceolatus (Scribn. and J.G. Sm.) Gould subsp. riparius (Scribn. & J.G. Sm.) Barkworth, N, 2, K, margins, Goodding 446-48, ASC.

Elymus repens (Linnaeus) Gould, E, 1, K, Crane and Murray Lakes, 2270–2600 m, Rink 11304, ASC.

Elymus trachycaulus (Link) Gould ex Shinners subsp. trachycaulus, N, 3, GK, throughout, 2130–2710 m, Goodding 507-48, ASC.

Elymus virginicus Linnaeus, uC, N, 2, GK, springs and ponds, 2370–2760 m, Rink 6572, ASC.

Elymus ×pseudoepens (Scribn. & J.G. Sm.) Barkworth & D.R. Dewey (Agropyron caillian- tianum (Wulf. & Schreb.) Trautv. ex Besser.), N, 1, G, 2440–2480 m, Kearney 13748, ARIZ.

Eragrostis curvula, (Schr.) Nees, H, 1, K, roadside (planted for erosion control), 2440 m, Seager, GRCA.

Eragrostis mexicana (Hornem.) Link, N, 1, GK, 2440 m, Seager sn, GRCA.

Festuca calligera Rydberg, N, 3, GK, high meadows, 2280–2730 m, Goodding 246-48, ARIZ. We cannot reliably discern F. calligera from F. saximontana.

Festuca idahoensis Elmer, N, 3, GK, throughout, 2260–2680 m, Rink 7574, ASC.

Festuca ovina Linnaeus, E, 2, GK, Rainbow Plateau and Pleasant Valley, 2290–2620 m, Reethen 2284, ASC.

Festuca rubra Linnaeus, N, 2, GK, high meadows, 2590–2730 m, Rink 6174, ARIZ.

Festuca saximontana Rydberg var. saximontana, N, 3, GK, throughout, 2130–2720 m, Rink 8046, ASC. We cannot reliably discern F. calligera from F. saximontana.
**Festuca sororia** Piper, N, 1, K, North Canyon, Goodding 370-48, ASC.

**Glyceria borealis** (Nash) Batchelder, N, 4, GK, emergent in lakes, 2250–2690 m, Goodding 250-48, ASC.

**Glyceria striata** (Lam.) A.S. Hitchc., N, 2, GK, springs and meadows, 2400–2690 m, Goodding 379-48, ASC.

**Hesperostipa comata** (Trin. & Rupr.) Barkworth subsp. comata (Stipa comata Trin. & Rupr. var. comata), N, 2, GK, rim edges, 2100–2590 m, Rink 7606, ASC.

**Hesperostipa comata** (Trin. & Rupr.) Barkworth subsp. intermedia (Scribn. & Tweedy) Barkworth (Stipa comata Trin. & Rupr. var. intermedia Scribn. & Tweedy), N, 2, GK, meadows, 2100–2710 m, Rink 7553, ASC.

**Hordeum brachyantherum** Nevski, N, 2, K, wet areas, 2370–2690 m, Rink 8918, ASC. Most of the KP collections appear to be subsp. californicum (Covas & Stebbins) Bothmer, N. Jacobsen & Seberg, having densely pubescent basal sheaths, although according to *Flora of North America*, this species is restricted to California. We may also have subsp. brachyantherum, Hodgson 18458, DES.

**Hord-deum jubatum** Linnaeus, N, 2, K, lakes, disturbed sites, 2350–2600 m, Rink 11470, ASC.

**Hord-eum murinum** Linnaeus subsp. glaucum (Steud.) Tzelev, nKP, E, 1, K, Castle Springs, 2230 m, Rink 11298, MNA.

**Koeleria macrantha** (Ledeb.) J.A. Schultes. (Koeleria nitida Nutt.), N, 3, GK, through 2130–2730 m, Rink 7566, ASC.

**Leymus cinereus** (Scribn. & Merr.) Á. Löve (Elymus cinereus Scribn. & Merr.), nKP, N, 1, K, tank 9022 east of Hwy. 67, 2740 m, Rink 10075, ASC.

**Leymus salinus** (M.E. Jones) Á. Löve (Elymus salina M.E. Jones), N, 1, K, plateau margins, <2350 m, Goodding 417-48, ASC. Barkworth and Atkins (UTC) annotated Goodding 249-49, collected at “The Gut”? and Oak Canyon, to possibly be “a hybrid between *L. salina* & *L. cinereus*,” ARIZ.

**Lolium perenne** Linnaeus, nKP, E, 1, K, Moquitch Tank_Allen’s Riding Corral, 2410–2560 m, Rink 10902, ASC.

**Muhlenbergia andina** (Nuttall) A.S. Hitchc., N, 2, GK, springs, 2130–2500 m, Rink 6188, ASC.

**Muhlenbergia curtisii** Scribn., N, 2, GK, 2130–2490 m, Rink 4514, ASC.

**Muhlenbergia filiformis** (Thurb. ex S. Watson) Rydberg, N, 2, GK, open areas, 2280–2750 m, Goodding 224-48, ASC.

**Muhlenbergia montana** (Nuttall) Hitchc., N, 4, GK, throughout, 2130–2720 m, Rink 8094, ASC. Many specimens we previously determined as *M. filiculmis* Vasey are depauperate forms of *M. montana*.

**Muhlenbergia racemosa** (Michx.) Britton, Sterns & Poggenb., N, 2, K, lower canyons, 2100–2440 m, Goodding 368-48, ASC.

**Muhlenbergia richardsonis** (Trin.) Rydberg, N, 3, GK, meadows, 2280–2660 m, Goodding 312-48, ASC.

**Muhlenbergia thurberi** Rydberg, N, 1, G, Bright Angel Pt., 2500 m, Merkle 710, GRCA.

**Muhlenbergia wrightii** Vasey ex Coult., N, 3, GK, throughout, 2440–2560 m, Rink 8002, ASC.

**Munroa squarrosa** (Nuttall) Torr., N, 1, K, Warm Springs Canyon, Goodding 297-48, ASC.

**Pascopyrum smithii** (Ryderberg) Á. Löve, N, 1, K, pine forest, 2100–2380 m, Boness sn, USFS-TEUI.

**Pheleum alpinum** Linnaeus, N, 2, GK, mostly in meadows, 2280–2780 m, Rink 7645, ASC.

**Pheleum pratense** Linnaeus, E, 2, GK, mostly in meadows, 2200–2710 m, Rink 7620, ASC.

**Piptatherum micranthum** (Trin. & Rupr.) Barkworth, N, 2, GK, throughout, 2130–2580 m, Goodding 252-49, ASC.

**Poa annua** Linnaeus, E, 1, K, East Lake, 2650 m, Goodding 314-48, ASC.

**Poa bulbosa** Linnaeus, E, 2, GK, disturbed areas, Rink 15559, ASC.

**Poa compressa** Linnaeus, E, 2, GK, disturbed areas, 2300–2690 m, Rink 7671, ASC.

**Poa fendleriana** (Steud.) Vasey var. fendleriana, N, 4, GK, throughout, 2130–2650 m, Go178-49, ASC.

**Poa fendleriana** (Steud.) Vasey var. longiligula (Scribn. & T.A. Williams) Soreng, N, 4, GK, throughout, 2120–2650 m, Goodding 130-49, ARIZ.

**Poa palustris** Linnaeus, N, 1, K, Big Spring, 2150 m, Stevens 1521, ASC.

**Poa pratensis** Linnaeus, H, 4, GK, wet places, 2130–2670 m, Rink 6573, ASC.

**Polypogon monspeliensis** (L.) Desf., E, 1, K, Big Springs Canyon in an old corral, 2130 m, Goodding 160-48, ASC. Goodding’s elevation for this collection is not accurate.

**Schedonorus armidacaeus** (Schreh.) Dumort., nKP, E, 2, GK, throughout in disturbed areas, 2120–2690 m, Rink 10019, ASC.

**Schedonorus pratensis** (Huds.) P. Beauv., nKP, E, 2, G, 2390 m, Rink 6577, ASC.

**Secale cereale** Linnaeus, E, 1, K, Jacob Reservoir, 2130 m, Goodding 105-48, ASC.

**Sporobolus cryptandrus** (Torr.) A. Gray, nKP, E, 2, K, through 2120–2690 m, Rink 8060, ASC.

**Thinopyrum intermedium** (Host) Barkworth & D.R. Dewey, E, 4, K, throughout, 2100–2710 m, Rink 8061, ASC.

**Thinopyrum ponticum** (Podp.) Z.-W. Wang, E, 1, K, Joe’s Mud Hole, Deer Lake, along Hwy. 67, 2300–2660 m, Rink 8065, ASC.
upper Big Spring Canyon, 2560 m, *Rink 9991*, ASC.

*Trisetum spicatum* (Linnaeus) Richter, N, 2, GK, high meadows, 2330–2660 m, *Rink 9887*, ASC.

*Triticum aestivum* Linnaeus, E, 1, G, heliport, disturbed or seeded areas, 2530 m, *Hurst 244*, GRCA.

**Potamogetonaceae**

(includes Zannichelliaceae)

*Potamogeton alpinus* Balbis, nKP, N, 1, K, Three Lakes, 2520 m, *Rink 11539*, ASC.


*Potamogeton gramineus* Linnaeus, N, 3, GK, lakes, 2370–2670 m, *Rink 8858*, ASC.

*Potamogeton natans* Linnaeus, N, 3, GK, lakes, 2570–2780 m, *Collom 13*, ASC.

*Potamogeton nodosus* Poir., N, 1, GK, Little Park and Frank’s Lakes, 2630–2690 m, *Rink 10686*, ASC.

*Potamogeton pusillus* Linnaeus subsp. *pusillus*, N, 1, G, Greenland Lake, 2550 m, *Rink 10905*, ASC.

*Zannichellia palustris* Linnaeus, nKP, N, 1, K, North Glenn Lake, 2660 m, *Rink 11558*, ASC.

**Typhaceae**

(includes Sparganiaceae)

*Sparganium emersum* Rehmann, N, 2, GK, emergent in lakes, 2280–2690 m, *Goodding 251-48*, ARIZ. We follow *Flora of North America* (FNA 1993–2016) that suggests *S. emersum* may be a stable hybrid that differs from the species as known in Europe, or that *S. angustifolium* is a variable species that includes *S. emersum*.

*Typha angustifolium* Michx., N, 2, GK, emergent in lakes, 2280–2690 m, *Goodding 251-48*, ARIZ.

*Typha latifolia* Linnaeus, nKP, N, 1, K, Frank’s Lake, 2650 m, *Rink 10892*, ASC.
## APPENDIX 2. Lakes visited as part of our collecting effort. Some lakes are not named, so we assigned numbers for them on our field maps. The last 2 columns are our observations at each lake. Blanks under the “condition” or “habitat” column indicate that those observations were not recorded.

<table>
<thead>
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<th>Lake</th>
<th>Easting</th>
<th>Nothing</th>
<th>Elevation (m)</th>
<th>Quadrangle</th>
<th>Condition</th>
<th>Habitat</th>
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**APPENDIX 3. Springs visited as part of our collecting effort. Some springs are not named, so we assigned numbers for them on our field maps. The last 2 columns are our observations at each spring. Blanks under the "condition" or "habitat" column indicate that those observations were not recorded.**

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**APPENDIX 4.** Tanks that were targets of this inventory effort. Some tanks do not have names, so we assigned names or numbers for them on our field maps. Blanks under the "condition" column indicate that condition observations were not recorded.

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<td>–112.1671</td>
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<td>2316</td>
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<td>36.5647</td>
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<td>2560</td>
<td>wet</td>
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<tr>
<td>Joe’s Mud Hole</td>
<td>–112.2101</td>
<td>36.5747</td>
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<td>2550</td>
<td>wet</td>
</tr>
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<td>Barn</td>
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<td>36.30739</td>
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<td>2679</td>
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</tr>
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<td>Jacob Reservoir</td>
<td>–112.230991</td>
<td>36.707175</td>
<td>Jacob Lake</td>
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<td>Lower Moquitch</td>
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<td>36.610131</td>
<td>Big Springs</td>
<td>2408</td>
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</tr>
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<td>Jack</td>
<td>–112.22713</td>
<td>36.67588</td>
<td>Jacob Lake</td>
<td>2438</td>
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<td>Warm Springs</td>
<td>–112.22808</td>
<td>36.665241</td>
<td>Jacob Lake</td>
<td>2445</td>
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<td>Ridge tank</td>
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<td>36.695602</td>
<td>Jacob Lake</td>
<td>2447</td>
<td>no tank</td>
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<td>Mud</td>
<td>–112.27326</td>
<td>36.62294</td>
<td>Big Springs</td>
<td>2484</td>
<td></td>
</tr>
<tr>
<td>Ds Up Moquitch</td>
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<td>36.586622</td>
<td>Big Springs</td>
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<td>wet</td>
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<td>8310</td>
<td>–112.23786</td>
<td>36.570038</td>
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<td>Upper Moquitch</td>
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<td>2577</td>
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<td>Dog Canyon</td>
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<td>36.450444</td>
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<td>2591</td>
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<tr>
<td>Spare</td>
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<td>wet</td>
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<tr>
<td>John’s</td>
<td>–112.05045</td>
<td>36.338714</td>
<td>Little Park Lake</td>
<td>2783</td>
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</tr>
</tbody>
</table>

**APPENDIX 5.** Sinks that were targets of this inventory effort. Few sinks have names, but we often assigned numbers or names for them on our field maps.

<table>
<thead>
<tr>
<th>Sink</th>
<th>Easting</th>
<th>Northing</th>
<th>Elevation (m)</th>
<th>Quadrangle</th>
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<td>Billy</td>
<td>–112.20479</td>
<td>36.69845</td>
<td>2414</td>
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<tr>
<td>E of Red Pt.</td>
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<td>36.58253</td>
<td>2414</td>
<td>Telephone Hill</td>
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<td>Jolly</td>
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<td>Jacob Lake</td>
</tr>
<tr>
<td>58</td>
<td>–112.2697</td>
<td>36.56592</td>
<td>2480</td>
<td>King Arthur Castle</td>
</tr>
<tr>
<td>Big dry</td>
<td>–112.213</td>
<td>36.65122</td>
<td>2500</td>
<td>Jacob Lake</td>
</tr>
<tr>
<td>Small dry</td>
<td>–112.2106</td>
<td>36.65062</td>
<td>2500</td>
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</tr>
<tr>
<td>Large</td>
<td>–112.2131</td>
<td>36.63714</td>
<td>2500</td>
<td>Jake Lake</td>
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<td>Three Lakes Sink</td>
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<td>36.6411</td>
<td>2500</td>
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<td>56a</td>
<td>–112.29072</td>
<td>36.341228</td>
<td>2335</td>
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</tr>
<tr>
<td>56b</td>
<td>–112.28667</td>
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<td>2393</td>
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<td>68</td>
<td>–112.21840</td>
<td>36.274466</td>
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<td>58</td>
<td>–112.21840</td>
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<td>Swamp Ridge</td>
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<td>36.266964</td>
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<td>Kanabownts Spring</td>
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<td>–112.23006</td>
<td>36.320233</td>
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<tr>
<td>18a</td>
<td>–112.22508</td>
<td>36.323159</td>
<td>2487</td>
<td>Kanabownts Spring</td>
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<tr>
<td>18b</td>
<td>–112.22687</td>
<td>36.321654</td>
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<td>–112.22069</td>
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<td>29a</td>
<td>–112.18066</td>
<td>36.333576</td>
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<td>29b</td>
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<td>28</td>
<td>–112.17625</td>
<td>36.338994</td>
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<td>Kanabownts Spring</td>
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<td>Dog sink</td>
<td>–112.09178</td>
<td>36.418125</td>
<td>2682</td>
<td>Dog Point</td>
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<tr>
<td>8843</td>
<td>–112.27550</td>
<td>36.398455</td>
<td>2695</td>
<td>Timp Point</td>
</tr>
<tr>
<td>46</td>
<td>–112.05301</td>
<td>36.296952</td>
<td>2720</td>
<td>Little Park Lake</td>
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<tr>
<td>Mble sinkhole</td>
<td>–112.06136</td>
<td>36.379</td>
<td>2737</td>
<td>Dog Point</td>
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</tbody>
</table>
APPENDIX 6. Mostly through herbarium review, we eliminated 230 taxa, mostly based on records from SEINet. These taxa were based on vouchers that we annotated to other taxa. Others were poorly georeferenced and could not be assigned to the flora area. After each plant name, we provide the results of our herbarium reviews. For example, *Equisetum palustre* remains undocumented for the Kaibab Plateau (KP). Many ASC specimens recorded on SEINet but not found were GooDing collections. Some of these were annotated and then refiled without being databased, making it difficult to relocate the specimens. In some cases, we have not reviewed the specimens, but they seem unlikely for the KP, so are, for now, discounted.

Ferns

**Equisetaceae**

*Equisetum palustre* Linnaeus, ASC and GRCA specimens annotated to *E. laevigatum*.

**Selaginellaceae**

*Selaginella leucobryoides* Maxon, ASC specimen annotated to *S. watsonii*.

**Dicotyledonous Plants**

**Amaranthaceae**

*Chenopodium desiccatum* A. Nelson, *Stevens sn*, MNA specimen too immature for accurate determination; GRCA specimens annotated to *C. pratericola*.

*Chenopodium incanum* (S. Wats.) Heller var. *occidentale* Crawford, RM specimen annotated to *C. i. var. incanum*.

*Chenopodium overi* Aellen, ARIZ specimen annotated to *C. capitatum*.

*Chenopodium subglabrum* (S. Wats.) A. Nelson, DES specimen not found.

**Anacardiaceae**

*Rhus glabra* Linnaeus, one specimen at DES annotated to *Sorbus dunnosa*.

**Apiaceae**

*Cicuta douglasii* (DC.) Coult. & Rose, we follow the *Intermountain Flora* (Cronquist et al. 1997) interpretation that *C. douglasii* is not in Arizona.

*Conioselinum scopulum* (A. Gray) Coult. & Rose, ASC specimen annotated to *Pseudocymopterus montanus*.

*Cymopterus fendleri* (Pursh) Raf., ARIZ specimen annotated to *Pseudocymopterus montanus*.

*Cymopterus grayanus* Tidestr., UTC specimen not examined, probably *Pseudocymopterus montanus*.

*Cymopterus purpurascens* (A. Gray) M.E. Jones, BRY specimen not reviewed by authors. This taxon is generally known from lower elevations surrounding the KP and is often confused with other taxa.

*Lomatium mohavense* (Coul. & Rose) Coul. & Rose, ASU specimen annotated to Apiaceae, probably *L. leptocarpum*.

*Perideridia gairdneri* (Hook. & Arn.) Mathias, reported by Phillips et al. (1987), ASC & GRCA specimens annotated to *Perideridia parishii*.

**Asteraceae**

*Amphipappus fremontii* Torr. & Gray subsp. spinosus (A. Nels.) Keck, SEINet location data entry error.

*Artemisia tridentata* var. *tridentata* Nutt., RM specimen by Swapp S-9 not in reproductive condition.

*Aster tephrades* (A. Gray) S.E Blake, ASC specimen annotated to *Dieteria mucronata* var. *bigelovii*.

*Brickellia baccharidea* A. Gray, specimen at ASC not found, probably annotated but not databased.

*Brickellia rusbyi* Gray, specimen at ASC annotated to *B. grandiflora*.

*Brickelliastrum fendleri* (Gray) King & H.E. Robins., DES specimen annotated to *Brickellia grandiflora*.

*Cirsium calcareum* (M.E. Jones) Woot. & Standl., all specimens annotated to *C. wheeleri* or *C. arizonicum* var. *bipinnatum*.

*Cirsium undulatum* (Nuttall) Spreng., all specimens annotated to other *Cirsium* species, primarily *Cirsium wheeleri*.

*Conyza coulteri* (A. Gray) G.L. Nesom, UCR specimen annotated to *C. schiedeana*.

*Dieteria asteroides* Torrey, ARIZ and UCR duplicates annotated to *M. bigelovii* var. *mucronata*.

*Dieteria canescens* (Pursh) Nuttall var. *canescens*, all specimens either annotated to something else, or not found.

*Dieteria canescens* (Pursh) A. Gray subsp. *incana* (Lindl.) A. Gray, MNA specimens annotated to *Dieteria canescens* var. *aristata* and *Dieteria canescens* var. *ambigua*.

*Dieteria canescens* var. *arenaria* (L.C. Anders.) G.L. Nesom & Baird, DES specimen annotated to *E. parryi* subsp. *nevadensis*.

*Ericameria nauseosa* (Pallas ex Pursh) G.L. Nesom & Baird var. *mohavensis* (Pall. ex Pursh) G.L. Nesom & Baird, specimens were collected below our elevation cutoff.

*Ericameria nauseosa* (Pallas ex Pursh) G.L. Nesom & Baird subsp. * nauseosa*, specimens annotated to *E. n. var. graveolens*.


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Ericameria parryi (A. Gray) G.L. Nesom & Baird var. parryi, UTC specimen annotated to E. p. var. nevadensis.

Erigeron bellidiastrum Nuttall, DES specimen annotated to E. fornosissimus.

Erigeron nudiflorus A. Gray, ASC specimen annotated to E. fornosissimus.

Erigeron puntius Nuttall var. subglaber (Cronquist) G.L. Nesom, DES specimen annotated to E. diversgens.

Erigeron tener (A. Gray) A. Gray, MNA specimen not found.

Erigeron ursinus D.C. Eat., two ASU specimens, one annotated to E. diversgens, the other to E. fornosissimus. DES specimen not found.

Erigeron utahensis Gray, D.C. Eat., two ASU specimens, and ARIZ specimens determined as E. diversgens.

Gaillardia parryi Greene, SEINet location data entry error.

Helianthus uniflora (Nuttall) Torr. & Gray, GRCA specimen annotated to H. quinquenervis.

Helianthus nuttallii Torr. & A. Gray, DES and UCR duplicates annotated to Heliantha quinquenervis.

Heliomeris longifolia (Robins. & Greemn.) Cockrell, DES and ASC duplicates annotated to Heliothera multiflora.

Heterotheca villosa (Pursh) Shinners var. foliosa (Nuttall) Harms, according to Semple (FNA), this variety does not occur on the KP.

Heterotheca viscosa (A. Gray) Harms, specimens annotated to H. villosa.

Hymenoxys lemmontii (Greene) Cockrell, two ASU specimens annotated to H. subintegra.

Hymenoxys richardsonii (Hook.) Cockrell, all specimens at TES and DES annotated to H. subintegra.

Hymenoxys russeyi (A. Gray) Cockrell, two ASU specimens annotated to H. subintegra.

Machaeranthera asteroides (Torr.) Greene, specimens at UCR and ARIZ annotated to D. bigelovii var. macounii.

Machaeranthera linearis Greene, GRCA specimen annotated to Dieteria canescens.

Machaeranthera parviflora A. Gray, DES specimen annotated to Dieteria canescens var. ambiguia.

Onopordum acanthium Linnaeus, reported by GRCA staff in the Walla Valley, near the Widforss Trailhead, and on the Walhalla Plateau, w/o voucher. Since determined as Cirsium vulgare.

Pseudognaphalium luteoalbum (Linnaeus) Hilliard & Burtt, TES specimen annotated to P. macounii.

Pseudognaphalium pringlei (A. Gray) A. Anderb., ASC specimen annotated to P. macounii.

Pseudognaphalium stramineum (Kunth) W.A. Weber, RM specimen annotated to P. macounii.

Pseudognaphalium viscosum (Kunth) W.A. Weber, GRCA specimen annotated to P. macounii.

Solidago canadensis Linnaeus, many specimens, probably either C. altissima (which may be synonymous with S. canadensis) or S. velutina.

Solidago simplex Kunth, specimens at ASC and ARIZ annotated to S. multiradiata.

Solidago spathulata DC. var. nana (A. Gray) Cronquist, specimen at ASU annotated to S. nana. Solidago spathulata var. nana is synonymous with Solidago simplex var. nana, which is a Pacific NW taxon.

Solidago wrightii A. Gray, DES specimen annotated to S. aff. altissima.

Stephanomeria pauciflora (Torr.) A. Nels., GRCA specimens annotated to S. minor subsp. minor.

Symphyotrichum spathulatum (Lindl.) Nesom, DES specimens annotated to S. ascendens.

Tragopogon pratensis Linnaeus, DES specimen annotated to T. dubius.

Boraginaceae

Amsinckia menziesii (Lehm.) A. Nelson & J.F. Macbr. var. intermedia (Fisch & C.A. Mey.) Ganders, MNA specimen annotated to Lithospermum multiflorum.

Cryptantha capitata (Eastw.) I.M. Johnston, MNA specimen annotated to C. confertaflora. GRCA specimen: SEINet location data entry error.

Cryptantha flava (A. Nelson) Payson, Hodgson 7095, ASU without fruit, determination uncertain; DES duplicate determined as C. confertifolia by Hodgson.

Eucrypta micrantha (Torr.) Heller, SEINet location data entry error.

Hesperochiron punlicus (Doug. ex Griseb.) Porter, reported in Phillips et al. (1987). No SEINet records.

Lappula occidentalis (S. Watson) Greene var. cupulata, SEINet location data entry error.

Macromeria viridiflora DC., DES specimen annotated to Lithospermum multiflorum.

Phacelia fremontii Torr., SEINet location data entry error.

Phacelia egena (Greene ex Brand) Greene ex J.T. Howell (Phacelia magellanica (Lam.) Coville p.p.) We concur with Cronquist et al. (1984) that these closely related plants can be treated as one binomial. We treat them as P. heterophylla, which is how most of them are presently determined.

Brassicaceae

Arabis demissa Greene, TES specimen annotated to B. pendulina.

Arabis drummondi A. Gray, specimens either not found, or annotated to Boechera stricta.

Arabis holboellii Hornem., three ASC specimens annotated to B. gracilipes.

Descurainia incana (Bernh. ex Fisch. & C.A. Mey.) Dorn, ASC specimen annotated to D. incisa.

GRCA specimen sterile, but probably D. incisa.
Descurainia incisa (Engelm. ex A. Gray) Britton subsp. paysonii (Detling) Rollins, all specimens seen have ascending pedicels, characteristic of subsp. incisa.

Descurainia paradoxa (A. Nels. & Kennedy) O.E. Schulz, DES specimen not found.

Descurainia richardsonii O.E. Schulz, ASC specimen annotated to D. incisa.

Draba cressifolia Graham, ARIZ specimen poor, not included; ASC specimen annotated to Draba rectifolia.

Erysimum asperum (Nuttall) DC., ASC specimens annotated to E. capitatum var. purshii. Varietal recognition for E. capitatum may not be justified as some specimens have three-forked hairs (a character of var. capitatum), but other characters of var. purshii.

Erysimum asperum var. O. polyacantha (Engelm. ex A. Gray) Britton, ARIZ specimen not included; ASC specimen annotated to E. capitatum.

Engelm. var. O. polyacantha (Engelm. ex A. Gray) M.E. Jones, two RM specimens annotated as some specimens have three-forked hairs (a character of var. capitatum), but other characters of var. purshii.

Lepidium lasiocarpum Nuttall, GRCA specimen not found, but presumed to have location data error.

Physaria fallax prov. sp., BRY specimen collected and provisionally named by S. O’Kane, that may not be a valid taxon per O’Kane (personal communication 2015).

Rorippa obtusa (Nuttall) Britton, ARIZ specimen annotated to R. curvipes.

Rorippa sinuata (Nuttall) Hitchc., ASC and GRCA specimens annotated to R. curvipes.

Rorippa teres (Michx.) R. Stuckey, ASC specimen not found.

Schoenocrambe linifolia (Nuttall) Greene, ASC specimen not found.

Cactaceae

Opuntia erinacea Engelm. & J.M. Bigelow ex Engelm. var. hystericina (Engelm. & J.M. Bigelow) L.D. Benson, GRCA specimens annotated to O. polyacantha var. erinacea.

Opuntia erinacea var. utahensis (Engelm.) L.D. Benson, DES specimen annotated to O. polyacantha var. erinacea.

Caprifoliaceae

Symphoricarpos Duham. ssp., nomenclature and taxonomy in this genus is unclear for the KP.

Valeriana capitata Pall ex Link, GRCA specimen annotated to V. acutloba.

Caryophyllaceae

Arenaria aberrans M.E. Jones, MNA specimen annotated to Erengone fendleri.

Arenaria aculeata S. Watson, MNA specimen annotated to Erengone fendleri.

Minuartia filorum (Maguire) McNeill, GRCA specimens annotated to either M. macrantha or Erengone fendleri.

Minuartia nuttallii (Pax) Briq., DES specimen annotated to Phlox austromontana.

Sagina decumbens (Elliott) Torr. & A. Gray, ASC specimen annotated to S. saginoides.

Silene noctiflora Linnaeus, two specimens at GRCA annotated to Silene latifolia var. alba

Stellaria calycantha (Ledeb.) Bong., ASC specimen annotated to S. umbellata.

Stellaria longipes Goldie, MNA specimen annotated to Stellaria longifolia.

Euphorbiaceae

Euphorbia alta J.B.S. Norton, ARIZ specimen not found, probably E. brachycera.

Euphorbia palmeri Engelm. ex S. Watson, three ASU specimens may be E. brachycera.

Fabaceae

Acmispon rigidus (Benth.) Brouillet, two RM specimens annotated to L. wrightii.

Astragalus argophyllus Nuttall var. panguicensis (M.E. Jones) M.E. Jones, ASC specimen annotated to A. castaneiformis.

Astragalus brandegeei Porter, ASC specimen annotated to A. miser.

Astragalus greenei A. Gray, two ASC specimens not found.

Astragalus hallii A. Gray, MNA specimen annotated to A. subsericeus.

Astragalus humistratus A. Gray var. hosackiae (Greene) M.E. Jones, two RM specimens annotated to A. h. var. tenerrimus.

Astragalus lentiginosus Douglas ex Hook. var. mokiaensis (A. Gray) M.E. Jones, reported for near Cliff Springs (Phillips et al. 1987), GRCA specimen w/o reproductive parts, annotated to Astragalus sp.

Astragalus praetongus Sheldon var. praetongus, DES specimen annotated to A. lentiginosus.

Astragalus tephroles A. Gray, specimen at TEUI in flower, but no fruit. This taxon occurs at lower elevations, mostly south of the Grand Canyon; unlikely on the KP.

Astragalus wootonii Sheldon, GRCA specimens annotated as some specimens have three-forked hairs (a character of var. capitatum), but other characters of var. purshii.

Dalea flavescens (S. Wats.) S.L. Welsh, ARIZ specimen annotated to D. candida var. oligophylla.

Lathyrus parviflorus S. Watson, ASC specimen annotated to L. laticircinatus.

Lotus plebeius (Brandege) Barneby, all specimens annotated to L. utahensis.

Lupinus hillii Greene var. osterhoutianus (C.P. Sm.) Harmon, GRCA specimens annotated as L. hillii var. hillii.

Lupinus brevicaulis S. Watson, USFS-TEUI specimen annotated to L. kingii.

Lupinus caudatus Kellogg (incl. L. aduncus Greene), all specimens annotated to L. argenteus.

Melilotus indicus (Linnaeus) All., ASC and DES specimens annotated to M. officinalis.

Oxytropis lambertii Pursh, DES and RM specimens annotated to O. oreophilus.

Trifolium maritimum Willd. ex Spreng., two DES specimens annotated to T. pinetorum.
**Fagaceae**

*Quercus grisea × turbinella*, Merkle 752 at GRCA annotated to *Q. arizonica*.

**Gentianaceae**

*Gentianella tenella* (Rottb.) Börner, GRCA specimen annotated to *Campanula parryi*.

**Hydrangeaceae**

*Fendlera wrightii* (A. Gray) A. Heller, GRCA specimen annotated to *G. diffusum* subsp. *parviflorum*.

**Polemoniaceae**

*Aliciella hutchinsifolia* (Rydberg) S.L. Welsh, many collections have been determined as such, but we believe the only large-flowered *Ipomopsis* on the KP is *I. tenuiulta*. See annotation in species list, Appendix 5.

**Plantaginaceae**

*Aliellia hutchinsifolia* (Rydberg) J.M. Porter, SEINet location data error.

*Ipomopsis macrosiphon* (Kearney & Peebles) V.E. Grant & Wilken, many collections have been determined as such, but we believe the only large-flowered *Ipomopsis* on the KP is *I. tenuiulta*. See annotation in species list, Appendix 5.

**Phloxaceae**

*Phlox amabilis* Brand, ASC specimen annotated to *P. longifolia*.

*Phlox hoodii* Richardson, ARIZ specimen annotated to *P. austromontana*.
Polygonaceae

Eriogonum abertianum Torr., specimen at RM not reviewed by authors; ASC specimen not found. This taxon at lower elevations in southern Arizona; unlikely to occur on the KP.

Eriogonum capillare Small, ASC specimen not located, occurrence unlikely for this location on the KP.

Eriogonum corngussum Benth. var. aureum (M.E. Jones) Reveal, Goodding 357-48 at ASC annotated to E. c. var. glutinosum.

Eriogonum ericifolium Torr. & A. Gray, GRCA specimen annotated to E. microthecum var. simpsonii.

Eriogonum fasciculatum Bentham, three GRCA and Eriogonum fasciculatum var. simpsonii.

Eriogonum flavum Benth., all specimens annotated to E. microthecum var. simpsonii.

Eriogonum glutinosum Nuttall var. purpureum (Nuttall) Durand, SEINet location data error.

Eriogonum jamesii Bentham, all specimens annotated to either E. arcuatum var. arcuatum or Eriogonum umbellatum var. subaridum, or not found.

Eriogonum leptophyllum (Torr. & A. Gray) Wooton & Standl., ASC specimen not found, occurrence very unlikely for this location on the KP.

Eriogonum ovalifolium Nuttall var. purpureum (Nuttall) Durand, SEINet location data error.

Eriogonum palmerianum Reveal, SEINet location data error, Goodding 257-49.

Eriogonum pulchrum Eastwood, GRCA specimen annotated to E. microthecum var. simpsonii.

Eriogonum subreniforme S. Watson, Goodding 37-48 at ASC annotated to E. cernuum.

Eriogonum umbellatum Torr. var. juniporinum Reveal, NY specimen not reviewed by authors. ASC and DES specimens annotated to E. heracleoides. Taxon not known for Arizona.

Polygonum bellardii All., ARIZ specimen not found, probably P. polygaloides subsp. kelloggii.

Polygonum minimum S. Watson, ASC specimen annotated to P. saxatilis.


Ranunculus riparius L. H. Bailey, recorded in SEINet as observation only; no specimen found.

Ranunculus occidentalis S. Wats., ASC specimen not found.

Portulaceae

Talinum brevifolium Torr., reported by Phillips et al. (1987), GRCA specimen annotated to Sedum lanceolatum.

Primulaceae

Dodecatheon pulchellum (Raf.) Merr., specimens annotated to D. alpinum.

Ranunculaceae

Actaea arizonica (S. Watson) J. Compton, reports from North Canyon with no voucher, probably Actaea rubra mistaken as A. arizonica.

Delphinium parishii A. Gray, GRCA specimen annotated to D. nuttallianum.

Delphinium scaposum Greene, DES specimen annotated to D. nuttallianum.

Myosurus apetalus Gay var. borealis Whitemore, DES specimen annotated to M. apetalus var. montanus.

Myosurus aristatus auct. non Bentham., ARIZ specimen annotated to M. apetalus var. montanus.

Ranunculus macounii Britton, ASC specimen annotated to R. uncinatus.

Rosaceae

Argentia anserina (Linnaeus) Rydberg ASC specimen annotated to Potentilla hippiana.

Geum alleppicum Jacq., GRCA specimen annotated to G. macrophyllum var. pericinsum.

Potentilla diversifolia Lehm., all specimens annotated to P. gracilis var. fastigiata or P. hippiana. Potentilla diversifolia not recognized in FNA.

Prunus serotina Ehrh., DES specimen annotated to P. virginiana.

Rubiaceae

Galium watsonii (A. Gray) A. Heller, GRCA specimen annotated to G. trifidum.

Salicaceae

Salix gooddingii C.R. Ball, reported by Phillips et al. (1987), GRCA specimen annotated to S. exigua.

Sapindaceae

Acer negundo Linnaeus subsp. neomexicanum (Greene) E. Murray. Reported in Phillips et al. (1987), appears to not be a valid name.

Solanaceae

Physalis crassifolia Benth., Mead sn at GRCA annotated to P. hederifolia var. palmeri.

Solanum douglasii Dunal, ASC specimen annotated to S. nigrum.

Sparganiaceae

Sparganium natan Linnaeus, ASC specimen not found. This is a more northern species.

Violaceae

Viola nuttallii Pursh, ASU specimen not found.

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Asparagaceae

Hesperocallis undulata A. Gray, ARIZ 92344 not found. Extremely unlikely.

Cyperaceae

Carex alma L.H. Bailey, ASC specimen annotated to C. occidentalis.

Carex hassen L.H. Bailey, C. hassen specimens probably are immature C. anrea.

Carex haydeniana Olney, reported in Phillips et al. (1987), probably from a misdetermined Collom specimen.
Carex retrorsa Schwein., PUA specimen annotated to C. vesicaria.
Carex scoparia Schkuhr ex Willd., two specimens at ASC and one at GRCA annotated to C. petasata.
Carex senta Booth, ASC specimen annotated to another Carex taxon.
Carex vulpinoides Michx., ASC specimen annotated to another Carex taxon.
Carex zeranatica L.H. Bailey, three DES specimens annotated to C. petasata.
Eleocharis obtusa (Willd.) Schult., all specimens annotated to E. engelmannii.
Eleocharis parisi (Roth.) Roem. & Schult., GRCA specimen annotated to E. engelmannii.
Eleocharis parvula (Roem. & Schult.) Link ex Bluff, Nees & Schauer var. anachaea (Torr.) Svenson, ASU specimen annotated to E. engelmannii.
Eleocharis quinqueflora (Hartman) O. Schwarz, MNA specimen annotated to E. acicularis. 
Fimbristylis Vahl, ASC specimen not located.

**Juncaceae**
Juncus drummondii E. Mey., ASC specimen not found, unlikely to occur in study area.
Juncus effusus Linnaeus, ASC specimen not found, unlikely to occur in study area.
Juncus ensifolius Wikstr., all specimens annotated to J. saximontanus. J. ensifolius does not occur in Arizona (Licher and Rink 2019).
Juncus mertensianus Bong., all specimens annotated to J. nevadensis. Juncus mertensianus does not occur in Arizona (Licher and Rink 2019).
Juncus tenuis Willd. var. tenuis, all specimens annotated to other Juncus taxa. J. balteatus, J. dudleyi, or J. interior.
Juncus xiphioides E. Mey., all Goodding specimens from Big Springs Canyon annotated to J. saximontatus.

**Liliaceae**
Allium nevadense S. Watson, RM specimen reported at a higher elevation than possible for the ver- bal location, also mis-mapped on SE1Net.
Calochortus aureus S. Watson, TES specimen annotated to C. nuttallii.
Calochortus flexuosus S. Watson, RM specimen annotated to C. nuttallii.

**Orchidaceae**
Platanthera hyperborea var. gracilis, GRCA specimens annotated to P. sparsiflora.

**Poaceae**
Achnatherum parishii (Vasey) Barkworth, GRCA specimens not found.
Achnatherum scribneri (Vasey) Barkworth, BRY specimen not reviewed by authors. ASC specimen annotated to A. lettermannii; this taxon poorly documented or nonexistent in Arizona. The KP has Achnatherum species that are similar.
Agrostis idahoensis Nash, DES specimen annotated to A. scabra.
Aristida purpurea Nuttall. var. longiseta (Steed.) Vasey, GRCA specimen annotated to Aristida purpurea var. fendleriana.
Bouteloua hirsuta Lag., reported in Phillips et al. (1987), no specimen.
Bromus anualus Rupr. ex Fourn., endemic to West Texas, ours are B. ciliatus, B. porteri, or B. richardsonii.
Deschampsia elongata (Hook.) Monro, ASC and GRCA specimen annotated to D. caespitosa.
Elymus canadensis Linnaeus, RM specimen annotated to E. elymoides; GRCA specimens annotated to E. elymoides and E. virgincus.
Elymus trachycaulus var. subsecundus (Link) Á. Löve & D. Löve, one ASC specimen, two ASU specimens and four GRCA specimens annotated to E. trachycaulus, or E. trachycaulus subsp. trachycaulus.
Festuca arizonica Vasey, GRCA specimen not found, other specimens annotated to other taxa.
Muhlenbergia filiculnis Vasey, GRCA specimen annotated to M. montana. NY specimen annotated to M. filiformis.
Muhlenbergia repens (J. Presl) Hitchc., ASC specimen not found, GRCA specimens annotated to M. richardsonis.
Nassella viridula (Trin.) Barkworth, RM specimen annotated to Achnatherum nelsonii subsp. nelsonii.
Poa arida Vasey, GRCA specimen annotated to Poa pratensis.
Poa bigelovii Vasey & Scribn., ASC specimen annotated to Poa sp.; MNA specimens annotated to Poa pratensis or Poa sp. or not found.
Poa interior Rydberg, ASC specimens annotated to Poa pratensis.
Poa mororalis Linnaeus subsp. interior (Rydberg) W.A. Web, all MNA specimens annotated to Poa pratensis.
Setaria viridis (Linnaeus) P. Beauv., ARIZ specimen not collected on the KP, but rather in Oak Creek Canyon, north of Sedona.
Sporobolus contractus Hitchc., RM specimen annotated to S. cryptandrus.
Stipa arida Jones, reported in Phillips et al. (1987), GRCA specimen annotated elsewhere.
Vulpia octoflora (Walter) Rydberg, GRCA specimen annotated to Festuca ovina.