VASCULAR PLANT INVENTORIES

AT

NAVAJO NATIONAL MONUMENT

2004

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ABSTRACT

The focus of the study at the Betatakin and Keet Seel units of Navajo National Monument (NAVA) was to provide park managers with an exotic & rare plant inventory. Complete area searches were conducted within all habitats over a 2-year period from May 2001 to September 2002. Twelve SWEMP (Southwest Exotic Plant Mapping Program) listed species were detected in the Betatakin unit (5% of flora). Five of these species were new to the NAVA species list. Seventeen taxa were considered exotic or not native (7% of the total flora). In addition to the previously known occurrence of the alcove bog-orchid, *Platanthera zothecina*, only one Colorado Plateau endemic was located during the survey, *Hesperodoria scopulorum*. No other federally listed or plants listed on the Navajo Endangered Species List (NESL) were found.

Eight SWEMP listed plant species dominate the overall vegetation cover of Keet Seel uplands (6 % of flora). Seventeen taxa (13 % of the flora) were exotic. No rare or sensitive federally listed species or plants listed under the NESL were located during the inventory although one Colorado Plateau endemic species, *Hesperodoria scopulorum*, grows on the small, undisturbed upland above the ranger station.

The focus of the study at the Inscription House Ruin unit of NAVA was to provide park managers with a baseline inventory. Complete area searches were conducted within all habitats over a 2-year period from May 2001 to September 2002. The 2-year inventory combined with known sources resulted in 177 plant species from 48 families. Seventy new species were added to the known plant list of Inscription House. Twelve SWEMP listed species were found within the Inscription House complex (7% of total flora). Sixteen taxa were considered exotic (9% of total flora). No rare federally listed species or NESL listed plants were found except for one

Colorado Plateau endemic, *Yucca angustissima var. toftiae*. This collection represented the first record of this taxon for Arizona.

Keywords: Navajo National Monument, vascular plant inventory, exotic plants, rare plants, northern Arizona, species list, National Park Service, SWEMP, Inventory & Monitoring Program

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INTRODUCTION

The National Park Omnibus Management Act, passed by the U.S. Congress in 1998, has provided federal support for a "program of inventory and monitoring of National Park Service (NPS) resources to establish baseline information and to provide information on the long-term trends in the condition of National Park Service resources." This Act also provides the basis for Congressional funding for the NPS-Servicewide Inventory and Monitoring Program (I&M). This nationwide I&M program is currently compiling and organizing existing resource data for 265 NPS units, and completing inventory and monitoring data to fill data gaps in existing information. The I&M program will provide NPS land managers with comprehensive, scientifically-based information about the nature and status of natural resources within their jurisdictions for the purposes of management decision-making, scientific research, and public education.

The Navajo Natural Heritage Program (NNHP) of the Navajo Nation Department of Fish and Wildlife agreed with the NPS to perform vascular plant inventories of two national parks contained within Navajo Nation lands in Arizona. These parks are Hubbell Trading Post National Historic Site in Apache County (HUTR), and Navajo National Monument (NAVA) in Navajo and Coconino counties. The Navajo Nation is situated within the south-central part of the Colorado Plateau and spans nearly 7 million hectares (17 million acres) across southern Utah, Arizona, and northwestern New Mexico. It has an elevation range between 853 m (2,800 ft) at the mouth of the Little Colorado River, to 3,175 m (10,416 ft) at the summit of Navajo Mountain.

Navajo National Monument (NAVA) was established to preserve three of the largest 13th -century cliff dwellings in northern Arizona. It is composed of three disjunct 'sub-units' that are

64.8 ha (160 acres) each for Keet Seel Ruin and Betatakin, and 16.2 ha (40 acres) for Inscription House Ruin. Each subunit is fairly isolated from excessive human intrusions due to their remote locations on the Navajo Nation within deep sandstone canyon lands.

Betatakin Ruin is within Betatakin Canyon of the Tsegi Canyon complex, approximately 24 km (15 miles) west of Kayenta. The elevation ranges from 1790 m (5873 ft) to 2210 m (7251 ft) within this subunit. The Betatakin unit is adjacent to the Monument headquarters, a 97 ha (240 acres) area leased from the Navajo Nation for a visitor center, campgrounds, overlooks, staff housing and administrative facilities. Keet Seel Ruin is located 22.5 km (14 miles) west of Kayenta, and within upper Keet Seel Canyon of the Tsegi Canyon complex. The range of elevations within the subunit's boundaries is from 2050 m (6726 ft) to 2280 m (7480 ft). Inscription House Ruin is approximately 52 km (32 miles) west of Kayenta, and located within Nitsin Canyon of the Navajo Creek complex.

Each of the three NAVA subunits is composed of the following habitat components: sheer-cliff Navajo Sandstone walls with overhung alcoves, Great Basin Conifer Woodland, riparian creek, and Great Basin Desertscrub /Desert-shrub.

The Betatakin Ruin subunit is mostly (~95%) composed of Great Basin Conifer Woodland. The sandstone bluff is approximately 140 m (460 ft) tall above the main ruins. Betatakin Canyon contains a unique relict riparian community composed of aspen (*Populus tremuloides*), boxelder (*Acer negundo*), Gambel oak (*Quercus gambelii*), false Solomon seal (*Maianthemum stellatum*), snowberry (*Symphoricarpos oreophilus*) and horsetails (*Equisetum hyemale).*

Approximately 45 ha (111 acres) (~70%) of the area within the Keet Seel unit is Great Basin Conifer Woodland which are primarily located above Keet Seel Canyon on an inaccessible

part of Skeleton Mesa. The canyon walls are 85 m (280 ft) high at the ruins. The flat area in front of the ruin is dominated by Gambel oak with an extensive understory of annual exotic plants. The perennial creek flowing through the eastern portion of the subunit is highly incised with walls up to 15 m (50 ft) high.

Approximately 11 ha (~70%) of the land contained within Inscription House Ruin unit is a nearly-inaccessible sandstone bluff, which is ca. 100 m (328 ft) high at the main ruins. Because of its inaccessibility to livestock, this bluff contains the most intact vegetation community outside of Betatakin Canyon. Sandy pockets on slickrock Navajo Sandstone support a community of Great Basin Conifer Woodland mixed with a healthy stand of native grasses and forbs. The remaining area is dominated by heavily-grazed desertscrub with sparse rabbit brush (*Chrysothamnus sp*.). A perennial tributary of Navajo Creek flows through the southern portion of the area. This creek has deeply-incised banks (up to 10 m or 33 ft) and riparian vegetation dominated by Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix sp.*), with some relict cottonwoods (*Populus fremontii*) and willows (*Salix sp*.) also present.

Because of the cultural preservation focus of the park in the past, little attention has been directed towards the natural resources present at the Monument. Previous floristic work at NAVA was based primarily on a specimen collection at the NAVA herbarium. This collection contained a total of 293 plant species, including 23 exotic species or ca. 8% of the known flora as of 1978 (Brotherson et al. 1978). Since the compilation of specimens at the Monument very little floristic work has been done there. During a floristic survey of the surrounding Tsegi Canyon area, Holiday (1998) found about 10% of the local flora consisted of exotic species. An inventory of threatened, endangered and candidate species found one population of the rare

alcove bog orchid, *Platanthera zothecina*, below the main ruin in Betatakin Canyon (Drost 2000).

METHODS

A baseline inventory was performed for the Inscription House Ruin unit of Navajo National Monument. At Betatakin Ruin and Keet Seel Ruin the focus was on exotic and special status plant inventories. Existing information was used and included whenever possible (Brotherson et.al.1978, Drost 2000, Holiday 1998). Baseline inventories were accomplished by performing complete area searches within the park boundaries.

A special focus during the baseline inventories was on sensitive habitats (hanging gardens, seeps and springs, and relict stands of vegetation), because they often contain a significant number of species not found elsewhere. For sensitive species encountered the standard protocol (Element Occurrence Form) used by the Natural Heritage Program was utilized. A field report on sensitive species included a map, habitat description, elevation, site condition, and associated species. Sensitive species lists were derived from the Navajo Nation Endangered Species List (NESL) as well as the Navajo Natural Heritage Program Element Tracking List (Appendices 3 & 4). The NESL includes federally listed species with a potential to occur in the study area. Noxious weeds were recorded according to the protocol and noxious weed species list of the Southwest Exotic Plant Mapping Program (SWEMP 2000), which included estimated area, cover percentage, density, and additional site-specific information. Exotic species were defined as plants that are not native to the United States. Voucher specimens were collected for each new species encountered and location of the collection was recorded using a Garmin Global Positioning System unit with an approximate accuracy of less than 15m.

Identifications were checked against descriptions in Cronquist et al. (1977, 1984, 1989, 1994, 1997), Kearney et al. (1960), McDougall (1973), and Welsh et al. (1993), or other recent treatments. Current taxonomy and exotic species status were determined from the USDA Plants Database (2004). All voucher specimens were deposited at the local park herbaria at Navajo National Monument and duplicate specimens were deposited at the NAU Deaver Herbarium (ASC) in Flagstaff and the Navajo Herbarium (NAVA) at the Department of Fish & Wildlife in Window Rock, AZ. Detailed information on plant specimens and their locations will be available at the NPS Inventory and Monitoring website at: http://www.nature.nps.gov/im

Fieldwork was conducted as follows: Betatakin: 2001: 5/7, 5/8, 8/8, 8/9. 2002: 5/22, 9/16, 9/17. Keet Seel: 2001: 5/9, 5/10, 8/29, 8/30. 2002: 5/24, 5/25, 9/26. Inscription House: 2001: 5/17, 8/6, 8/7. 2002: 5/21, 8/26, 8/27.

INVENTORY OBJECTIVES

Inventory objectives described in Stuart (2000) were:

1. To document the occurrence of at least 90% of vascular plant species estimated to occur in the parks and monuments.
2. To describe the distribution and relative abundance of species of special concern with emphasis on special habitats, rare and endangered species, and exotic species.
3. To provide a baseline of information to develop a monitoring strategy for special emphasis species and habitats identified in the inventory.
4. To develop a data management system accessible to park managers, scientists, and the public.

RESULTS

The number of species found in all three units of NAVA increased from 293 to 357 taxa (Table 1). Sixty-four new species were found during the inventory period. The number of SWEMP listed species increased from 12 to 16 since 1978. No new federally listed or NESL listed plants were found.

Betatakin

The total number of vouchered specimens is 409, representing 249 species from 58 plant families (Appendix 1A, Table 2). Thirty-five of these vouchers were collected during the 2001-2002 inventory period. The remainder came from previous collections and a plant study within the three units of the Monument (Brotherson et al. 1978, Table 3). Betatakin Canyon is the least disturbed of the three Park units and therefore contains the lowest cover in weedy exotic species. Exotic species richness in Betatakin Canyon is similar to that of the Inscription House unit. Twelve SWEMP listed species were detected in the Betatakin unit (Table 4). Five of these species were new to the NAVA species list (Puncture vine, *Tribulus terrestris*, spiny sowthistle, *Sonchus asper*, bull thistle, *Cirsium vulgare*, crossflower, *Chorispora tenella*, Russian olive, *Elaeagnus angustifolia*). Seventeen species (7% of the total flora) were considered non-native (Appendix 2A). Species richness of exotic species was similar during the 2 years while abundance, cover, and distribution were significantly lower in 2002 over the 2001 values. Most noxious weeds and exotic species were found near roads, headquarters and the campgrounds along the rim, but also on and below the recently burned midden of the main ruin and along the trails. Cover of all exotic species overall was very low during both years, generally less than 1% per area surveyed.

In addition to the previously known occurrence of the alcove bog-orchid, *Platanthera zothecina* (NESL G3), only one Colorado Plateau endemic, Grand Canyon glowweed, *Hesperodoria scopulorum*, was located during the survey. The relict Gambel oak/aspen forest at the canyon bottom provides one of two special habitats in this unit. Many of the aspen are old and decadent or dying. The understory is composed of a dense stand of mostly horsetail (*Equisetum hyemale),* redosier dogwood (*Cornus sericea*), mountain snowberry *(Symphoricarpos oreophilus),* Wood's rose (*Rosa woodsii*) and starry false lily of the valley (*Maianthemum stellatum*). The other sensitive habitat is a series of hanging gardens inside the ruin alcove, and just below the alcove. The hanging gardens were very dry with little water discharge during both survey years. The vegetation community in the hanging gardens is composed of dryland species such as sandstone milk-vetch (*Astragalus sesquiflorus*), pinion *(Pinus edulis)* and hairy false goldenaster (*Heterotheca villosa)* as well as hanging garden endemics such as Mancos columbine (*Aquilegia micrantha)*, Eastwood's monkeyflower *(Mimulus eastwoodiae)* and alcove bog-orchid (*Platanthera zothecina)*.

In 2002 monitoring of the rare alcove bog-orchid, *Platanthera zothecina*, was re-initiated from a 1999 and 2000 study of the only population at Navajo National Monument, below Betatakin ruin (Hudson 2000). In 2002, 2093 plants were observed, of which 149 were reproductive. This is an approximate return to population numbers observed in 1999, when 1,944 plants were counted in three monitoring plots (Figure 1). In 2000 only 1,151 plants were counted. The largest decline in the number of plants was in plot 4, below the midden. In 2000, 237 plants were found in plot 4; only 23 plants remained in 2002. The largest increase in the number of plants was recorded in plot 3, where the number of plants increased from 627 to 1,684 in the two-year period. The reproductive effort of this species remains low, ranging between 6

and 7 % during the three study years (Figure 2). In 2002, 7 % of all plants encountered were flowering.

Inscription House

During the 2-year inventory 130 specimens were collected on 40 acres, bringing the cumulative total of vouchered specimens to 321, representing 177 species from 48 families (Appendix 1B, Table 2.). Sixty-nine new species were added to the known plant list of the Inscription House unit (Table 4). Twelve SWEMP listed species were found within the Inscription House complex. Three of these were new additions to the species list (*Sonchus asper*, *Tribulus terrestris,* Canadian horseweed, *Conyza canadensis*). Sixteen taxa, approximately 9 % of total flora, were considered exotic (Appendix 2B). Exotic species were almost exclusively limited to areas outside the fenced-off portions of the units, especially the riparian area, where they were the dominant life form. No listed rare species were found except for one Colorado Plateau endemic, Toft's yucca (*Yucca angustissima var. toftiae).* This collection presented the first record of this variety of narrowleaf yucca (*Y. angustissima)* for Arizona. The drought of 2002 severely impacted the abundance of annual species at Inscription House, especially exotic annuals. No annual plants were found in uplands during the spring survey. Those recorded were restricted to riparian zones. Species richness of exotic species remained the same while abundance, cover, and distribution were significantly lower in 2002 than in 2001. Inscription House contains one sensitive habitat type, a small section of a mostly perennial tributary to Navajo Creek. This wash has deeply incised with steeply eroded banks and is dominated by exotic riparian vegetation including tamarisk and Russian olive.

Keet Seel

A total of 45 specimens were collected during the 2-year survey period for identification, verification, and documentation purposes (Appendix 1C). The total number of vouchered specimens from the Keet Seel site now totals 233, representing 135 species from 41 plant families (Table 2). Keet Seel maintained the highest cover of exotic weedy species among the three Monument units. Eight SWEMP listed plant species dominate the overall vegetation cover of Keet Seel uplands (Table 4). Two of the SWEMP listed species were new to the Keet Seel species list (*Cirsium vulgare, Chorispora tenella*). Seventeen species were considered exotic at Keet Seel, approximately 13 % of the flora (Appendix 2C). In 2001 it was estimated that approximately over half of the Keet Seel uplands were covered by exotic annual species. Species richness of exotics remained the same while abundance, cover, and distribution were significantly lower in 2002 than in 2001. Few annual plants were found in uplands during the spring 2002 survey; those recorded were restricted to run-off areas and riparian zones. No listed rare or sensitive species were located during the inventory although one Colorado Plateau endemic species, *Hesperodoria scopulorum*, was found on the small, undisturbed upland above the ranger station. Keet Seel contains one sensitive habitat type; a seep area below the ruin is dominated by woolly sedge (*Carex pellita)* and *Mimulus eastwoodiae* but does not contain any of the sensitive species found in other hanging gardens in the surrounding area. Water discharge along the alcove walls was minimal during the 2 years of study, leaving most of the *Mimulus eastwoodiae* dried up and dying.

DISCUSSION AND RECOMMENDATIONS

The NPS estimated that 90% inventory completeness would be achieved by documenting a total of 323 plant species in all of the NAVA units. Our inventory detected a 357 species, thereby exceeding the estimated number of species substantially. Assuming the original NPS estimate was accurate, the plant species inventory at NAVA can be considered nearly complete. Considering the small size of the Inscription House unit (and the other two units) combined with the extent and duration of field surveys, we feel that the inventory objective has been met.

Despite the fact habitat for Navajo sedge (*Carex specuicola,* NESL G3) exists in two of the three Monument units, no plants were found. Navajo Sedge, a federally listed (threatened) species endemic to the hanging gardens of northern Arizona and southern San Juan County, Utah, is frequently found in the hanging gardens of the Tsegi watershed. Perhaps the plants existed in the Park prior to the discovery and excavation of Keet Seel and Betatakin. The seeps at these sites likely provided water for early archaeological explorers and their livestock. Grazing by horses could have easily eliminated the sedge from the two sites, since they are easily accessible. The seep in the alcove at Betatakin ruin still provides habitat for the alcove bog orchid (*Platanthera zothecina*). Although the total number of plants remained stable over the years, the number of plants in each plot varied significantly through time. The lowest monitoring plot experienced a drastic change in plant numbers following a mudslide in response to a prescribed fire. The location is now very dry with a very low component of wet site species. The plot with the largest increase in orchids is the most difficult to work with of the 4 plots. Accurate counts require crawling through thick brush and poison ivy. Counting error might be a

large part in the differences in numbers between years. Reproductive effort continues to be very low. The seep appears to be drying up and the community is shifting from a wet site species community to a mostly dryland community composition. Perhaps the drying of the habitat is related to low reproductive rates in this population. It was also observed that many flowering stalks had been eaten by unidentified herbivores. Monitoring of the hydrological changes in the seep and the spring is highly recommended. A continuation of the monitoring effort of the orchid population at least on a biannual basis is also recommended.

Hesperodoria scopulorum is an endemic species to northwestern Arizona and southern Utah. Originally collected by J. Fairchild in 1977 at the Betatakin and the Inscription House units, it was relocated in 2002 at Betatakin and Keet Seel units. It is unclear why it was not found at Inscription House during this inventory effort. It is possible that the original location was erroneously reported and that Fairchild actually did collect it from Keet Seel instead of Inscription House. This species is not considered endangered by the Navajo Natural Heritage Program due to the lack of threats to its habitat and the number of known occurrences outside the Nation. It is however ranked S1 (very rare) by the Heritage Program because of its rarity within reservation boundaries. It is of no special management concern because it is considered stable with few threats to its habitat in Utah and northern Arizona. *Yucca angustissima var. toftiae* is mainly known from the Glen Canyon region in Utah. While it is endemic to Glen Canyon, it is locally common; therefore, it is not considered to be of special management concern.

Many of the aspen in the relict aspen forest along the dry wash are old, dying, dead or decadent. The understory is dense with perennial vegetation. Thinning of the understory and aspen might rejuvenate the forest and return it to a more healthy state. Otherwise it will continue to be a large fire hazard and the aspen will slowly disappear from Betatakin Canyon.

Both Keet Seel and Inscription House units have a major problem with erosion along the unit boundaries. The perennial washes bordering these units continue to erode and downcut the already very steep wash banks. Inscription House ruin is almost inaccessible, Keet Seel continues to loose its land base to Keet Seel Wash and the boundary fence needs to be relocated on a regular basis. Much of the flat areas in front of the ruins are covered by annual weeds, providing little or no erosion control. Controlling the spread of exotics in these two areas is difficult due to their remote locations and accessibility restrictions. Revegetation with native perennial species is equally difficult for the same reasons.

Among the three NAVA units, it is surprising that the most remote unit, Keet Seel would have the highest percentage and cover of noxious weed species and exotics. A likely source is from the many years of horse pack trips that brought visitors to the backcountry at Keet Seel. It is common practice to supplement feed for pack horses on the Navajo Nation with hay from non-certified weed-free sources. Keet Seel now has substantially higher exotic and noxious species diversity than any other surrounding backcountry area. There are also substantially more weedy species just inside the NPS boundary fence than is outside the fence. The outside is severely overgrazed, while the inside has been protected from grazing since the 1970s. However, despite the lack of grazing, noxious weeds had likely already established themselves by the time the fence was erected. The grazing animals were removed allowing the weeds to freely spread and reproduce in the disturbed uplands of Keet Seel. Outside the fence grazing continued and many weedy species that were palatable to livestock never could establish themselves.

The Inscription House unit is mostly composed of slickrock Navajo Sandstone with sandy pockets. Native vegetation is well established in these pockets. Most of these areas have also been fenced. The small flat area below Inscription House Ruin, as well as the riparian area,

is outside the NPS fencing. The areas outside the fence are severely overgrazed and impacted by livestock, giving the competitive advantage to unpalatable noxious weeds and exotics.

Betatakin unit has the highest number of exotic and SWEMP listed species of the three NAVA units; however, abundance and cover were consistently low. Weedy species were limited to high impact areas surrounding parking areas and a few small disturbed sites. The Betatakin unit gets the most impact from visitors. It is located on a paved road and is the main attraction for most visitors. The visitor center is located at the rim of Betatakin Canyon. This makes Betatakin the most likely NAVA unit for new weedy species to enter the Monument. In an effort to keep the Betatakin unit from becoming a staging area for noxious weed invasion, inventory and removal should be part of annual maintenance duties.

ACKNOWLEDGEMENTS

Funding for this project came from the NPS Inventory & Monitoring Program. Thanks go to Anne Cully and Ron Hiebert for logistic and technical support and also to Nicole Tancreto for help with data management and current taxonomic treatments. Thanks to Melissa Memory and the NAVA staff for providing logistical support and help in the field. Many thanks to Tina Ayers, Randy Scott, Matt Berry, Marc Baker and Wendy Hodgson for helping with the field work.

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Table 1. Number of previously and currently recorded vascular plant species at Navajo National Monument, AZ; based on Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

	Previous	**Current**
Total No. of Species	293	357
No. of Exotic Species	23	30
No. of SWEMP Species	12	16
No. of Rare Species	2	3

Table 2. Number and status of vascular plant species at Navajo National Monument, AZ; based on Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

Monument Unit	**No. of Species**	**No. of SWEMP Species**	**No. of Exotic Species**	**No. of Rare Species**
Betatakin	249	12	17	2
Keet Seel	135	8	17	1
Inscription House	177	12	16	1

Table 3. Number of vascular plant species additions per unit at Navajo National Monument, AZ; based on Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

Monument Unit	**No. of Previously Known Species**	**No. of Currently Known Species**	**Species Additions**
Betatakin	223	249	26
Keet Seel	108	135	27
Inscription House	108	177	69

Table 4. Abundance and distribution of SWEMP listed species at Navajo Nation Monument, AZ. Based on 2001 data.

Species	**Location**	**Abundance**
Bromus tectorum	Betatakin	Occasional
	Keet Seel	Common
	Inscription House	Occasional
Chorispora tenella	Betatakin	Rare
	Keet Seel	Occasional
Cirsium vulgare	Betatakin	Rare
	Keet Seel	Rare
Conyza canadensis	Betatakin	Rare
	Inscription House	Common
	Keet Seel	Occasional
Descurainia sophia	Betatakin	Occasional
	Inscription House	Rare
	Keet SeeI	Common
Elaeagnus angustifolia	Betatakin	Rare
	Inscription House	Occasional
Erodium cicutarium	Betatakin	Common
	Keet Seel	Common
	Inscription House	Common
Kochia scoparia	Inscription House	Occasional

Species	**Location**	**Abundance**
Melilotus alba	Betatakin	Rare
Melilotus officinalis	Betatakin	Rare
Portulaca oleracea	Betatakin Keet Seel Inscription House	Occasional Common Occasional
Salsola tragus	Betatakin Keet Seel Inscription House	Occasional Common Occasional
Sonchus asper	Betatakin Inscription House	Rare Rare
Tamarix ramosissima	Inscription House	Occasional
Tribulus terrestris	Betatakin Inscription House	Rare Rare
Xanthium strumarium	Keet Seel Inscription House	Occasional Occasional

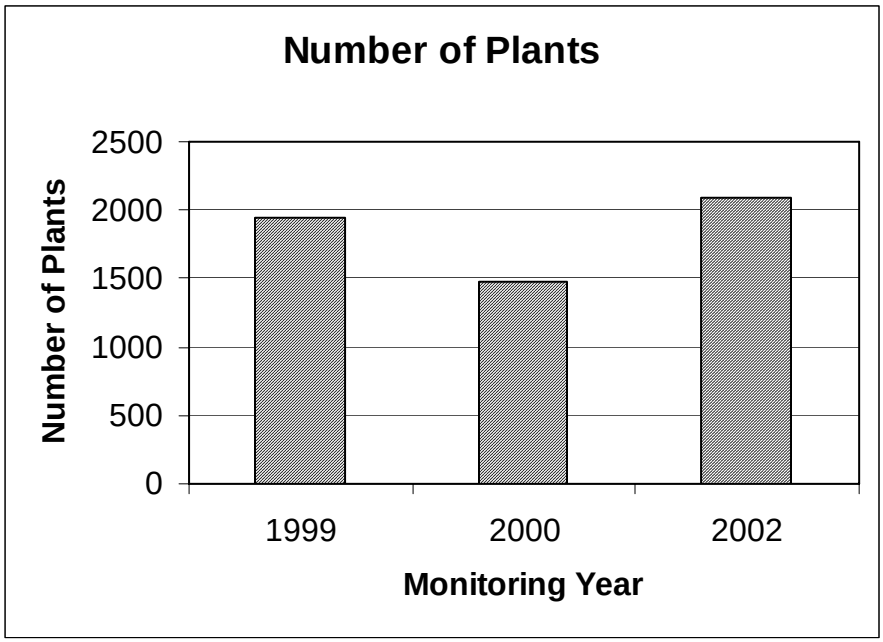

Figure 1. Total number of alcove Bog Orchid plants in four monitoring plots at Betatakin Canyon, Navajo Co., AZ, from 1999 - 2002

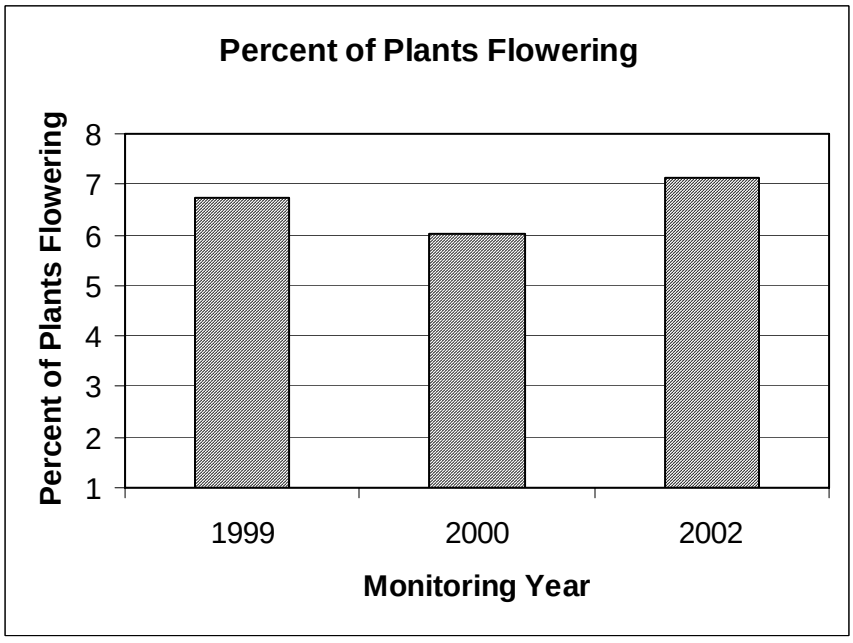

Figure 2. Percent of Alcove Bog Orchids flowering in four monitoring plots at Betatakin Canyon Navajo County, AZ, from 1999 - 2002.

Appendix 1A. Voucher specimens and their collectors from Betatakin Unit; list includes collections published by Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

Family Name	Latin Name	Collector
Aceraceae	*Acer glabrum*	D. Roth
Aceraceae	*Acer negundo*	J. W. Brewer
Aceraceae	*Acer negundo*	M. Skougard and G. Nebeker
Agavaceae	*Yucca angustissima*	J.W. Brewer
Agavaceae	*Yucca angustissima*	M. Skougard and G. Nebeker
Agavaceae	*Yucca baccata*	M. Skougard and G. Nebeker
Anacardiaceae	*Rhus trilobata*	M. Skougard and G. Nebeker
Anacardiaceae	*Toxicodendron radicans*	M. Wetherill
Apiaceae	*Cymopterus newberryi*	J.W. Brewer
Apocynaceae	*Apocynum X floribundum*	M. Wetherill
Asteraceae	*Achillea millefolium*	M. Skougard and G. Nebeker
Asteraceae	*Antennaria marginata*	J. Fairchild
Asteraceae	*Antennaria neglecta*	M. Skougard and G. Nebeker
Asteraceae	*Antennaria parvifolia*	J. W. Brewer
Asteraceae	*Antennaria parvifolia*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia campestris*	J. Fairchild
Asteraceae	*Artemisia campestris ssp. borealis var. scouleriana*	J. Fairchild
Asteraceae	*Artemisia dracunculus*	D. Roth
Asteraceae	*Artemisia dracunculus*	J. Fairchild
Asteraceae	*Artemisia dracunculus*	J. W. Brewer
Asteraceae	*Artemisia frigida*	J. Fairchild
Asteraceae	*Artemisia frigida*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia frigida*	M. Wetherill
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Artemisia nova*	J. Fairchild
Asteraceae	*Artemisia tridentata*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia tridentata*	M. Wetherill
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia microphylla var. scabra*	J. Fairchild
Asteraceae	*Chaenactis stevioides*	M. Skougard and G. Nebeker
Asteraceae	*Chaetopappa ericoides*	J. Fairchild
Asteraceae	*Chaetopappa ericoides*	M. Skougard and G. Nebeker
Asteraceae	*Chaetopappa ericoides*	S. P. Brewer
Asteraceae	*Chrysothamnus pulchellus*	J. W. Brewer
Asteraceae	*Chrysothamnus viscidiflorus*	J. Fairchild
Asteraceae	*Cirsium calcareum*	J. Fairchild
Asteraceae	*Cirsium vulgare*	D. Roth

Family Name	Latin Name	Collector
Asteraceae	*Conyza canadensis*	D. Roth
Asteraceae	*Conyza canadensis*	J. Fairchild
Asteraceae	*Erigeron concinnus*	J. Fairchild
Asteraceae	*Erigeron concinnus*	J. Fairchild
Asteraceae	*Erigeron concinnus*	M. Skougard and G. Nebeker
Asteraceae	*Erigeron divergens*	J. Fairchild
Asteraceae	*Erigeron divergens*	J. W. Brewer
Asteraceae	*Erigeron divergens*	J. W. Brewer
Asteraceae	*Erigeron divergens*	M. Skougard and G. Nebeker
Asteraceae	*Erigeron flagellaris*	J. Fairchild
Asteraceae	*Erigeron flagellaris*	J. Fairchild
Asteraceae	*Erigeron glabellus*	M. Skougard and G. Nebeker
Asteraceae	*Erigeron speciosus*	D. Roth
Asteraceae	*Erigeron speciosus var. macranthus*	J. Fairchild
Asteraceae	*Erigeron speciosus var. macranthus*	J. Fairchild
Asteraceae	*Erigeron speciosus var. macranthus*	M. Wetherill
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Euthamia occidentalis*	M. Skougard and G. Nebeker
Asteraceae	*Gaillardia pinnatifida*	M. Skougard and G. Nebeker
Asteraceae	*Gutierrezia microcephala*	J. W. Brewer
Asteraceae	*Gutierrezia sarothrae*	J. Fairchild
Asteraceae	*Gutierrezia sarothrae*	M. Skougard and G. Nebeker
Asteraceae	*Gutierrezia sarothrae*	M. Wetherill
Asteraceae	*Hesperodoria scopulorum*	D. Roth
Asteraceae	*Hesperodoria scopulorum*	J. Fairchild
Asteraceae	*Hesperodoria scopulorum*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	M. Skougard and G. Nebeker
Asteraceae	*Hymenopappus filifolius*	J. Fairchild
Asteraceae	*Hymenopappus filifolius*	J. Fairchild
Asteraceae	*Hymenopappus filifolius*	M. Skougard and G. Nebeker
Asteraceae	*Hymenopappus filifolius var. lugens*	J. W. Brewer
Asteraceae	*Hymenoxys bigelovii*	J. Fairchild
Asteraceae	*Hymenoxys bigelovii*	M. Skougard and G. Nebeker
Asteraceae	*Hymenoxys richardsonii*	J. Fairchild
Asteraceae	*Lactuca tatarica var. pulchella*	J. Fairchild
Asteraceae	*Lactuca tatarica var. pulchella*	J. W. Brewer
Asteraceae	*Lactuca tatarica var. pulchella*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera canescens ssp. canescens var. incana*	J. Fairchild
Asteraceae	*Machaeranthera canescens var. glabra*	J. M. Rominger
Asteraceae	*Machaeranthera grindelioides*	J. Fairchild

Family Name	Latin Name	Collector
Asteraceae	*Machaeranthera grindelioides*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	J. W. Brewer
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Wetherill
Asteraceae	*Malacothrix sonchoides*	M. Skougard and G. Nebeker
Asteraceae	*Packera multilobata*	J. Fairchild
Asteraceae	*Packera multilobata*	J. W. Brewer
Asteraceae	*Packera multilobata*	M. Skougard and G. Nebeker
Asteraceae	*Psilostrophe sparsiflora*	J. Fairchild
Asteraceae	*Psilostrophe sparsiflora*	J. Fairchild
Asteraceae	*Psilostrophe sparsiflora*	M. Skougard and G. Nebeker
Asteraceae	*Psilostrophe sparsiflora*	M. Wetherill
Asteraceae	*Solidago canadensis*	M. Skougard and G. Nebeker
Asteraceae	*Sonchus asper*	D. Roth
Asteraceae	*Stephanomeria exigua*	J. Fairchild
Asteraceae	*Stephanomeria exigua*	J. M. Rominger
Asteraceae	*Stephanomeria exigua*	M. Skougard and G. Nebeker
Asteraceae	*Stephanomeria minor var. minor*	J.D. Brotherson
Asteraceae	*Stephanomeria thurberi*	J. Fairchild
Asteraceae	*Taraxacum officinale*	M. Skougard and G. Nebeker
Asteraceae	*Tetradymia canescens*	J. Fairchild
Asteraceae	*Tetradymia canescens*	M. Skougard and G. Nebeker
Asteraceae	*Tetraneuris acaulis var. acaulis*	J. Fairchild
Asteraceae	*Tetraneuris acaulis var. acaulis*	J. W. Brewer
Asteraceae	*Tetraneuris ivesiana*	J. W. Brewer
Asteraceae	*Townsendia incana*	J. Fairchild
Asteraceae	*Townsendia incana*	J. W. Brewer
Asteraceae	*Townsendia incana*	M. Skougard and G. Nebeker
Berberidaceae	*Mahonia repens*	E. Jackson
Berberidaceae	*Mahonia repens*	J. W. Brewer
Berberidaceae	*Mahonia repens*	M. Skougard and G. Nebeker
Berberidaceae	*Mahonia repens*	M. Wetherill
Betulaceae	*Betula occidentalis*	J. W. Brewer
Betulaceae	*Betula occidentalis*	M. Skougard and G. Nebeker
Betulaceae	*Betula occidentalis*	M. Wetherill
Betulaceae	*Betula occidentalis*	W. S. Phillips
Boraginaceae	*Cryptantha cinerea var. jamesii*	J. Fairchild
Boraginaceae	*Cryptantha cinerea var. jamesii*	J. Fairchild
Boraginaceae	*Cryptantha cinerea var. jamesii*	M. Skougard and G. Nebeker
Boraginaceae	*Cryptantha confertiflora*	J. W. Brewer
Boraginaceae	*Cryptantha crassisepala*	M. Skougard and G. Nebeker
Boraginaceae	*Cryptantha flava*	J. Fairchild
Boraginaceae	*Cryptantha flava*	M. Skougard and G. Nebeker

Family Name	Latin Name	Collector
Boraginaceae	*Cryptantha pterocarya*	M. Skougard and G. Nebeker
Boraginaceae	*Lappula occidentalis*	J. Fairchild
Boraginaceae	*Lappula occidentalis var. occidentalis*	J. Fairchild
Boraginaceae	*Lappula occidentalis var. occidentalis*	M. Skougard and G. Nebeker
Boraginaceae	*Lappula occidentalis var. occidentalis*	M. Wetherill
Boraginaceae	*Lithospermum multiflorum*	J. Fairchild
Brassicaceae	*Arabis perennans*	J. Fairchild
Brassicaceae	*Arabis perennans*	J.W. Brewer
Brassicaceae	*Arabis pulchra*	E. Lehnert
Brassicaceae	*Chorispora tenella*	D. Roth
Brassicaceae	*Descurainia pinnata*	J. Fairchild
Brassicaceae	*Descurainia pinnata*	J.W. Brewer
Brassicaceae	*Descurainia sophia*	D. Roth
Brassicaceae	*Descurainia sophia*	E. Lehnert
Brassicaceae	*Descurainia sophia*	M. Skougard and G. Nebeker
Brassicaceae	*Erysimum capitatum var. capitatum*	J. Fairchild
Brassicaceae	*Erysimum capitatum var. capitatum*	J.W. Brewer
Brassicaceae	*Erysimum capitatum var. capitatum*	J.W. Brewer
Brassicaceae	*Erysimum capitatum var. capitatum*	M. Skougard and G. Nebeker
Brassicaceae	*Lepidium montanum*	J. Fairchild
Brassicaceae	*Lepidium montanum*	M. Skougard and G. Nebeker
Brassicaceae	*Lesquerella ludoviciana*	J.W. Brewer
Brassicaceae	*Lesquerella ludoviciana*	M. Skougard and G. Nebeker
Brassicaceae	*Lesquerella rectipes*	J. Fairchild
Brassicaceae	*Sisymbrium altissimum*	J. Fairchild
Brassicaceae	*Sisymbrium altissimum*	J.M. Rominger
Brassicaceae	*Streptanthella longirostris*	M. Skougard and G. Nebeker
Brassicaceae	*Streptanthus cordatus*	E. Lehnert
Brassicaceae	*Streptanthus cordatus*	J. Fairchild
Brassicaceae	*Streptanthus cordatus*	J.W. Brewer
Brassicaceae	*Streptanthus cordatus*	J.W. Brewer
Brassicaceae	*Streptanthus cordatus*	M. Skougard and G. Nebeker
Brassicaceae	*Thlaspi montanum var. fendleri*	J.W. Brewer
Cactaceae	*Echinocereus fendleri*	J. W. Brewer
Cactaceae	*Echinocereus triglochidiatus*	M. Skougard and G. Nebeker
Cactaceae	*Opuntia erinacea*	J. W. Brewer
Cactaceae	*Opuntia fragilis*	J. W. Brewer
Cactaceae	*Opuntia polyacantha*	J. Fairchild
Cactaceae	*Opuntia polyacantha*	M. Skougard and G. Nebeker
Cactaceae	*Sclerocactus parviflorus*	M. Skougard and G. Nebeker
Cactaceae	*Sclerocactus parviflorus ssp. terrae-canyonae*	D. Roth
Cactaceae	*Sclerocactus whipplei*	J. W. Brewer
Capparaceae	*Cleome serrulata*	J. Fairchild
Capparaceae	*Cleome serrulata*	J. W. Brewer
Capparaceae	*Cleome serrulata*	M. Wetherill
Caprifoliaceae	*Symphoricarpos oreophilus*	D. Roth
Caprifoliaceae	*Symphoricarpos oreophilus var. utahensis*	M. Skougard and G. Nebeker

Family Name	Latin Name	Collector
Caryophyllaceae	*Arenaria eastwoodiae*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	M. Wetherill
Chenopodiaceae	*Chenopodium album*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	D. Roth
Chenopodiaceae	*Chenopodium fremontii*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	M. Wetherill
Chenopodiaceae	*Salsola tragus*	M. Skougard and G. Nebeker
Commelinaceae	*Tradescantia occidentalis*	J. Fairchild
Commelinaceae	*Tradescantia occidentalis*	J.M. Rominger
Commelinaceae	*Tradescantia occidentalis*	J.W. Brewer
Cornaceae	*Cornus sericea ssp. sericea*	J.W. Brewer
Cornaceae	*Cornus sericea ssp. sericea*	M. Skougard and G. Nebeker
Cornaceae	*Cornus sericea ssp. sericea*	M. Wetherill
Crassulaceae	*Sedum stenopetalum*	J.W. Brewer
Cupressaceae	*Juniperus osteosperma*	J. Fairchild
Cupressaceae	*Juniperus osteosperma*	M. Skougard and G. Nebeker
Cyperaceae	*Carex occidentalis*	J. Fairchild
Cyperaceae	*Carex occidentalis*	J. Fairchild
Cyperaceae	*Carex rossii*	D. Roth
Cyperaceae	*Carex rossii*	J. Fairchild
Cyperaceae	*Carex vallicola*	D. Roth
Cyperaceae	*Eleocharis palustris*	J. Fairchild
Cyperaceae	*Eleocharis palustris*	J. Fairchild
Elaeagnaceae	*Elaeagnus angustifolia*	D. Roth
Elaeagnaceae	*Shepherdia rotundifolia*	J. Fairchild
Elaeagnaceae	*Shepherdia rotundifolia*	M. Skougard and G. Nebeker
Ephedraceae	*Ephedra viridis*	J. Fairchild
Ephedraceae	*Ephedra viridis*	M. Skougard and G. Nebeker
Equisetaceae	*Equisetum hyemale*	D. Roth
Equisetaceae	*Equisetum hyemale*	W. S. Phillips
Ericaceae	*Arctostaphylos pungens*	M. Wetherill
Euphorbiaceae	*Euphorbia brachycera*	J.W. Brewer
Fabaceae	*Astragalus amphioxys*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus ceramicus*	J. Fairchild
Fabaceae	*Astragalus ceramicus*	J.W. Brewer
Fabaceae	*Astragalus ceramicus*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus mollissimus var. thompsoniae*	J. Fairchild
Fabaceae	*Astragalus mollissimus var. thompsoniae*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus sesquiflorus*	D. Roth
Fabaceae	*Astragalus sesquiflorus*	E. Lehnert
Fabaceae	*Astragalus sesquiflorus*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus zionis*	J. Fairchild
Fabaceae	*Astragalus zionis*	J. Fairchild

Family Name	Latin Name	Collector
Fabaceae	*Lathyrus brachycalyx*	J. Fairchild
Fabaceae	*Lathyrus brachycalyx*	J.W. Brewer
Fabaceae	*Lathyrus brachycalyx*	M. Skougard and G. Nebeker
Fabaceae	*Lathyrus lanszwertii var. leucanthus*	J. Fairchild
Fabaceae	*Lupinus argenteus*	J. Fairchild
Fabaceae	*Medicago sativa*	M. Skougard and G. Nebeker
Fabaceae	*Melilotus alba*	J. Fairchild
Fabaceae	*Melilotus officinalis*	J. Fairchild
Fagaceae	*Quercus gambelii*	J. Fairchild
Fagaceae	*Quercus gambelii*	J.W. Brewer
Fagaceae	*Quercus gambelii*	M. Skougard and G. Nebeker
Fumariaceae	*Corydalis aurea*	M. Skougard and G. Nebeker
Geraniaceae	*Erodium cicutarium*	M. Skougard and G. Nebeker
Geraniaceae	*Geranium atropurpureum*	J. Fairchild
Geraniaceae	*Geranium atropurpureum*	J.W. Brewer
Geraniaceae	*Geranium atropurpureum*	J.W. Brewer
Geraniaceae	*Geranium atropurpureum*	M. Skougard and G. Nebeker
Geraniaceae	*Geranium caespitosum*	D. Roth
Grossulariaceae	*Ribes cereum*	J. Fairchild
Grossulariaceae	*Ribes cereum*	J. Fairchild
Grossulariaceae	*Ribes viscosissimum*	D. Roth
Hydrangeaceae	*Fendlera rupicola*	J. Fairchild
Hydrangeaceae	*Fendlera rupicola*	M. Skougard and G. Nebeker
Hydrophyllaceae	*Phacelia crenulata var. corrugata*	M. Skougard and G. Nebeker
Hydrophyllaceae	*Phacelia ivesiana*	J.W. Brewer
Juncaceae	*Juncus balticus*	J. Fairchild
Lamiaceae	*Dracocephalum parviflorum*	M. Skougard and G. Nebeker
Liliaceae	*Allium macropetalum*	J.W. Brewer
Liliaceae	*Allium macropetalum*	M. Skougard and G. Nebeker
Liliaceae	*Calochortus nuttallii*	J.W. Brewer
Liliaceae	*Calochortus nuttallii*	M. Skougard and G. Nebeker
Liliaceae	*Fritillaria atropurpurea*	M. Skougard and G. Nebeker
Liliaceae	*Fritillaria atropurpurea*	M. Wetherill
Liliaceae	*Maianthemum stellatum*	J. Fairchild
Liliaceae	*Maianthemum stellatum*	M. Skougard and G. Nebeker
Liliaceae	*Maianthemum stellatum*	M. Skougard and G. Nebeker
Linaceae	*Linum perenne*	M. Wetherill
Loasaceae	*Mentzelia albicaulis*	J.W. Brewer
Loasaceae	*Mentzelia albicaulis*	M. Skougard and G. Nebeker
Malvaceae	*Sidalcea neomexicana*	M. Skougard and G. Nebeker
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	M. Skougard and G. Nebeker
Malvaceae	*Sphaeralcea parvifolia*	J. Fairchild
Malvaceae	*Sphaeralcea parvifolia*	J.W. Brewer
Malvaceae	*Sphaeralcea parvifolia*	M. Skougard and G. Nebeker
Nyctaginaceae	*Abronia elliptica*	J. Fairchild

Family Name	Latin Name	Collector
Nyctaginaceae	*Abronia elliptica*	J.W. Brewer
Nyctaginaceae	*Abronia fragrans*	M. Skougard and G. Nebeker
Nyctaginaceae	*Mirabilis linearis*	J.W. Brewer
Nyctaginaceae	*Mirabilis linearis*	J.W. Brewer
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J. Fairchild
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J.M. Rominger
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J.W. Brewer
Onagraceae	*Oenothera albicaulis*	M. Skougard and G. Nebeker
Onagraceae	*Oenothera caespitosa*	J. Fairchild
Onagraceae	*Oenothera caespitosa*	M. Skougard and G. Nebeker
Onagraceae	*Oenothera elata*	D. Roth
Onagraceae	*Oenothera elata ssp. hookeri*	J.W. Brewer
Onagraceae	*Oenothera longissima*	J. Fairchild
Orchidaceae	*Platanthera zothecina*	M. Skougard and G. Nebeker
Orchidaceae	*Platanthera zothecina*	D. Roth
Pinaceae	*Pinus edulis*	J. M. Rominger
Pinaceae	*Pinus edulis*	M. Skougard and G. Nebeker
Pinaceae	*Pseudotsuga menziesii*	M. Skougard and G. Nebeker
Plantaginaceae	*Plantago patagonica*	M. Skougard and G. Nebeker
Poaceae	*Achnatherum hymenoides*	M. Skougard and G. Nebeker
Poaceae	*Aristida arizonica*	M. Skougard and G. Nebeker
Poaceae	*Aristida purpurea var. fendleriana*	J. Fairchild
Poaceae	*Aristida purpurea var. fendleriana*	J. Fairchild
Poaceae	*Bouteloua gracilis*	J. Fairchild
Poaceae	*Bromus carinatus*	M. Skougard and G. Nebeker
Poaceae	*Bromus ciliatus*	J. Fairchild
Poaceae	*Bromus ciliatus*	M. Skougard and G. Nebeker
Poaceae	*Bromus marginatus*	J. Fairchild
Poaceae	*Bromus tectorum*	J. Fairchild
Poaceae	*Bromus tectorum*	M. Skougard and G. Nebeker
Poaceae	*Elymus caninus*	J. Fairchild
Poaceae	*Elymus caninus*	M. Skougard and G. Nebeker
Poaceae	*Elymus elymoides ssp. elymoides*	J. Fairchild
Poaceae	*Elymus elymoides ssp. elymoides*	M. Skougard and G. Nebeker
Poaceae	*Elymus glaucus*	J. Fairchild
Poaceae	*Glyceria striata*	J. Fairchild
Poaceae	*Hesperostipa comata ssp. comata*	J. Fairchild
Poaceae	*Hordeum murinum ssp. leporinum*	M. Skougard and G. Nebeker
Poaceae	*Muhlenbergia andina*	J. Fairchild
Poaceae	*Muhlenbergia pungens*	J.M. Rominger
Poaceae	*Muhlenbergia pungens*	M. Skougard and G. Nebeker
Poaceae	*Muhlenbergia thurberi*	J. Fairchild
Poaceae	*Piptatherum micranthum*	J. Fairchild
Poaceae	*Piptatherum micranthum*	M. Skougard and G. Nebeker
Poaceae	*Poa fendleriana*	M. Skougard and G. Nebeker
Poaceae	*Poa fendleriana*	M. Wetherill
Poaceae	*Poa fendleriana*	M. Wetherill

Family Name	Latin Name	Collector
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	M. Wetherill
Poaceae	*Poa pratensis*	J. Fairchild
Poaceae	*Poa pratensis*	M. Skougard and G. Nebeker
Poaceae	*Polypogon monspeliensis*	J. Fairchild
Poaceae	*Polypogon monspeliensis*	M. Skougard and G. Nebeker
Poaceae	*Puccinellia nuttalliana*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J.M. Rominger
Poaceae	*Sporobolus cryptandrus*	M. Skougard and G. Nebeker
Poaceae	*Sporobolus flexuosus*	M. Skougard and G. Nebeker
Poaceae	*Vulpia octoflora*	J. Fairchild
Polemoniaceae	*Gilia leptomeria*	M. Skougard and G. Nebeker
Polemoniaceae	*Gilia scopulorum*	M. Skougard and G. Nebeker
Polemoniaceae	*Gilia subnuda*	M. Skougard and G. Nebeker
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	J. Fairchild
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	M. Skougard and G. Nebeker
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J. Fairchild
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J. Fairchild
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J.M. Rominger
Polemoniaceae	*Leptodactylon pungens*	M. Skougard and G. Nebeker
Polemoniaceae	*Phlox austromontana*	J. Fairchild
Polemoniaceae	*Phlox longifolia*	M. Skougard and G. Nebeker
Polygonaceae	*Eriogonum alatum*	J. Fairchild
Polygonaceae	*Eriogonum alatum*	M. Skougard and G. Nebeker
Polygonaceae	*Eriogonum cernuum*	M. Skougard and G. Nebeker
Polygonaceae	*Eriogonum microthecum*	D. Roth
Polygonaceae	*Eriogonum microthecum*	E. Jackson
Polygonaceae	*Eriogonum microthecum*	J. Fairchild
Polygonaceae	*Eriogonum microthecum*	J.M. Rominger
Polygonaceae	*Eriogonum microthecum*	M. Skougard and G. Nebeker
Polygonaceae	*Eriogonum umbellatum*	D. Roth
Polygonaceae	*Eriogonum umbellatum var. cognatum*	J. Fairchild
Primulaceae	*Androsace septentrionalis*	J. Fairchild
Ranunculaceae	*Aquilegia micrantha*	J.W. Brewer
Ranunculaceae	*Aquilegia micrantha*	J.W. Brewer
Ranunculaceae	*Aquilegia micrantha*	M. Skougard and G. Nebeker
Ranunculaceae	*Clematis ligusticifolia*	M. Skougard and G. Nebeker
Ranunculaceae	*Delphinium nuttallianum*	J.W. Brewer
Ranunculaceae	*Delphinium nuttallianum*	J.W. Brewer
Ranunculaceae	*Delphinium nuttallianum*	M. Skougard and G. Nebeker
Ranunculaceae	*Delphinium parishii ssp. parishii*	M. Skougard and G. Nebeker
Ranunculaceae	*Delphinium scaposum*	J.W. Brewer
Ranunculaceae	*Thalictrum fendleri*	J.W. Brewer
Ranunculaceae	*Thalictrum fendleri*	J.W. Brewer
Rosaceae	*Amelanchier utahensis*	J. Fairchild

Family Name	Latin Name	Collector
Rosaceae	*Amelanchier utahensis*	S.P. Brewer
Rosaceae	*Cercocarpus intricatus*	J. Fairchild
Rosaceae	*Cercocarpus intricatus*	J.W. Brewer
Rosaceae	*Cercocarpus intricatus*	M. Skougard and G. Nebeker
Rosaceae	*Cercocarpus intricatus*	M. Wetherill
Rosaceae	*Holodiscus dumosus*	J.W. Brewer
Rosaceae	*Holodiscus dumosus*	M. Wetherill
Rosaceae	*Prunus virginiana*	M. Skougard and G. Nebeker
Rosaceae	*Purshia mexicana*	M. Skougard and G. Nebeker
Rosaceae	*Purshia tridentata*	M. Skougard and G. Nebeker
Rosaceae	*Rosa woodsii*	J. Fairchild
Rosaceae	*Rosa woodsii*	J.W. Brewer
Rosaceae	*Rosa woodsii*	M. Skougard and G. Nebeker
Rubiaceae	*Galium triflorum*	M. Skougard and G. Nebeker
Rubiaceae	*Kelloggia galioides*	J. Fairchild
Salicaceae	*Populus fremontii*	M. Skougard and G. Nebeker
Salicaceae	*Populus tremuloides*	M. Skougard and G. Nebeker
Salicaceae	*Salix exigua*	M. Skougard and G. Nebeker
Salicaceae	*Salix gooddingii*	J. Fairchild
Salicaceae	*Salix lasiolepis*	J. Fairchild
Santalaceae	*Comandra umbellata ssp. pallida*	J. Fairchild
Santalaceae	*Comandra umbellata ssp. pallida*	J. Fairchild
Saxifragaceae	*Heuchera parvifolia*	M. Skougard and G. Nebeker
Saxifragaceae	*Heuchera rubescens*	M. Skougard and G. Nebeker
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	M. Skougard and G. Nebeker
Scrophulariaceae	*Cordylanthus wrightii*	E. Jackson
Scrophulariaceae	*Cordylanthus wrightii*	J.M. Rominger
Scrophulariaceae	*Mimulus eastwoodiae*	J. Fairchild
Scrophulariaceae	*Mimulus eastwoodiae*	J. Fairchild
Scrophulariaceae	*Penstemon ambiguus*	J. Fairchild
Scrophulariaceae	*Penstemon barbatus*	J. Fairchild
Scrophulariaceae	*Penstemon comarrhenus*	J. Fairchild
Scrophulariaceae	*Penstemon comarrhenus*	J.W. Brewer
Scrophulariaceae	*Penstemon eatonii*	J.D. Brotherson
Scrophulariaceae	*Penstemon eatonii*	M. Skougard and G. Nebeker
Scrophulariaceae	*Penstemon virgatus*	J. Fairchild
Solanaceae	*Datura wrightii*	J. Fairchild
Solanaceae	*Physalis hederifolia var. fendleri*	J. Fairchild
Solanaceae	*Physalis hederifolia var. fendleri*	M. Skougard and G. Nebeker
Valerianaceae	*Valeriana acutiloba*	D. Roth
Verbenaceae	*Verbena bracteata*	M. Skougard and G. Nebeker
Viscaceae	*Arceuthobium campylopodum*	M. Wetherill
Viscaceae	*Phoradendron juniperinum*	M. Skougard and G. Nebeker
Zygophyllaceae	*Tribulus terrestris*	D. Roth

Appendix 1B. Voucher specimens and their collectors for Inscription House Unit; list includes collections published by Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

Family Name	Latin Name	Collector
Agavaceae	*Yucca angustissima*	J.W. Brewer
Agavaceae	*Yucca angustissima*	M. Skougard and G. Nebeker
Agavaceae	*Yucca angustissima var. toftiae*	D. Roth
Amaranthaceae	*Amaranthus albus*	J. Fairchild
Anacardiaceae	*Rhus trilobata*	M. Skougard and G. Nebeker
Anacardiaceae	*Rhus trilobata var. simplicifolia*	D. Roth
Anacardiaceae	*Rhus trilobata var. simplicifolia*	D. Roth
Asclepiadaceae	*Asclepias asperula*	D. Roth
Asclepiadaceae	*Asclepias subverticillata*	D. Roth
Asclepiadaceae	*Asclepias subverticillata*	J. Fairchild
Asclepiadaceae	*Asclepias subverticillata*	M. Skougard and G. Nebeker
Asclepiadaceae	*Funastrum cynanchoides ssp. cynanchoides*	D. Roth
Asteraceae	*Ambrosia acanthicarpa*	D. Roth
Asteraceae	*Ambrosia acanthicarpa*	J. Fairchild
Asteraceae	*Ambrosia acanthicarpa*	J. Fairchild
Asteraceae	*Ambrosia artemisiifolia*	J. Fairchild
Asteraceae	*Artemisia bigelovii*	D. Roth
Asteraceae	*Artemisia dracunculus*	J. Fairchild
Asteraceae	*Artemisia dracunculus*	J. W. Brewer
Asteraceae	*Artemisia frigida*	J. Fairchild
Asteraceae	*Artemisia frigida*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia frigida*	M. Wetherill
Asteraceae	*Artemisia ludoviciana*	D. Roth
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Brickellia californica*	D. Roth
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia microphylla var. scabra*	D. Roth
Asteraceae	*Brickellia microphylla var. scabra*	J. Fairchild
Asteraceae	*Chaenactis stevioides*	D. Roth
Asteraceae	*Chaenactis stevioides*	M. Skougard and G. Nebeker
Asteraceae	*Chrysothamnus depressus*	J. Fairchild
Asteraceae	*Chrysothamnus greenei*	D. Roth
Asteraceae	*Chrysothamnus pulchellus*	J. W. Brewer
Asteraceae	*Chrysothamnus viscidiflorus*	J. Fairchild
Asteraceae	*Conyza canadensis*	D. Roth
Asteraceae	Ericameria nauseosa ssp. nauseosa var. glabrata	D. Roth

Family Name	Latin Name	Collector
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	J. Fairchild
Asteraceae	*Erigeron belladiastrum*	D. Roth
Asteraceae	*Erigeron divergens*	D. Roth
Asteraceae	*Erigeron divergens*	D. Roth
Asteraceae	*Erigeron divergens*	J. Fairchild
Asteraceae	*Erigeron divergens*	J. W. Brewer
Asteraceae	*Erigeron divergens*	J. W. Brewer
Asteraceae	*Erigeron divergens*	M. Skougard and G. Nebeker
Asteraceae	*Erigeron flagellaris*	J. Fairchild
Asteraceae	*Erigeron flagellaris*	J. Fairchild
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Erigeron utahensis*	J. Fairchild
Asteraceae	*Gutierrezia microcephala*	D. Roth
Asteraceae	*Gutierrezia sarothrae*	J. Fairchild
Asteraceae	*Gutierrezia sarothrae*	M. Skougard and G. Nebeker
Asteraceae	*Gutierrezia sarothrae*	M. Wetherill
Asteraceae	*Hesperodoria scopulorum*	J. Fairchild
Asteraceae	*Hesperodoria scopulorum*	J. Fairchild
Asteraceae	*Heterotheca villosa*	D. Roth
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	M. Skougard and G. Nebeker
Asteraceae	*Heterotheca villosa var. villosa*	D. Roth
Asteraceae	*Lactuca serriola*	D. Roth
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	J. W. Brewer
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Wetherill
Asteraceae	*Malacothrix sonchoides*	M. Skougard and G. Nebeker
Asteraceae	*Pseudognaphalium luteoalbum*	D. Roth
Asteraceae	*Psilactis asteroides*	J. Fairchild
Asteraceae	*Psilostrophe sparsiflora*	D. Roth
Asteraceae	*Senecio spartiodes*	D. Roth
Asteraceae	*Sonchus asper*	D. Roth
Asteraceae	*Sonchus asper*	D. Roth
Asteraceae	*Stephanomeria exigua*	D. Roth
Asteraceae	*Stephanomeria minor var. minor*	D. Roth
Asteraceae	*Taraxacum officinale*	D. Roth
Asteraceae	*Tetradymia canescens*	J. Fairchild
Asteraceae	*Tetradymia canescens*	M. Skougard and G. Nebeker

Family Name	Latin Name	Collector
Asteraceae	*Tetraneuris ivesiana*	D. Roth
Asteraceae	*Townsendia incana*	D. Roth
Asteraceae	*Verbesina encelioides*	J. Fairchild
Asteraceae	*Xanthium strumarium*	D. Roth
Asteraceae	*Xanthium strumarium*	D. Roth
Boraginaceae	*Cryptantha barbigera*	D. Roth
Boraginaceae	*Cryptantha capitata*	D. Roth
Boraginaceae	*Cryptantha cinerea var. jamesii*	J. Fairchild
Boraginaceae	*Cryptantha cinerea var. jamesii*	J. Fairchild
Boraginaceae	*Cryptantha cinerea var. jamesii*	M. Skougard and G. Nebeker
Boraginaceae	*Cryptantha fulvocanescens*	D. Roth
Boraginaceae	*Cryptantha pterocarya*	D. Roth
Boraginaceae	*Heliotropium convolvulaceum*	D. Roth
Brassicaceae	*Arabis perennans*	J. Fairchild
Brassicaceae	*Arabis perennans*	J.W. Brewer
Brassicaceae	*Descurainia sophia*	E. Lehnert
Brassicaceae	*Descurainia sophia*	M. Skougard and G. Nebeker
Brassicaceae	*Lepidium montanum*	J. Fairchild
Brassicaceae	*Lepidium montanum*	M. Skougard and G. Nebeker
Brassicaceae	*Streptanthella longirostris*	M. Skougard and G. Nebeker
Cactaceae	*Echinocereus fendleri*	J. W. Brewer
Cactaceae	*Echinocereus triglochidiatus*	D. Roth
Cactaceae	*Opuntia erinacea*	J. W. Brewer
Cactaceae	*Opuntia phaeacantha*	D. Roth
Cactaceae	*Opuntia polyacantha*	D. Roth
Cactaceae	*Opuntia polyacantha*	D. Roth
Cactaceae	*Opuntia polyacantha*	J. Fairchild
Cactaceae	*Opuntia polyacantha*	M. Skougard and G. Nebeker
Cactaceae	*Opuntia whipplei*	D. Roth
Cactaceae	*Opuntia whipplei*	D. Roth
Cactaceae	*Opuntia whipplei*	J. Fairchild
Cactaceae	*Sclerocactus parviflorus ssp. terrae-canyonae*	D. Roth
Cactaceae	*Sclerocactus whipplei*	D. Roth
Capparaceae	*Cleome serrulata*	D. Roth
Capparaceae	*Cleome serrulata*	J. Fairchild
Capparaceae	*Cleome serrulata*	J. W. Brewer
Capparaceae	*Cleome serrulata*	M. Wetherill
Caryophyllaceae	*Arenaria eastwoodiae*	D. Roth
Caryophyllaceae	*Arenaria eastwoodiae*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	D. Roth
Chenopodiaceae	*Atriplex canescens*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	M. Wetherill
Chenopodiaceae	*Chenopodium album*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	D. Roth

Family Name	Latin Name	Collector
Chenopodiaceae	*Chenopodium fremontii*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	M. Wetherill
Chenopodiaceae	*Chenopodium glaucum*	J. Fairchild
Chenopodiaceae	*Chenopodium glaucum*	M. Skougard and G. Nebeker
Chenopodiaceae	*Chenopodium leptophyllum*	D. Roth
Chenopodiaceae	*Chenopodium pratericola*	J. Fairchild
Chenopodiaceae	*Kochia scoparia*	J. Fairchild
Chenopodiaceae	*Salsola tragus*	D. Roth
Chenopodiaceae	*Salsola tragus*	M. Skougard and G. Nebeker
Chenopodiaceae	*Sarcobatus vermiculatus*	D. Roth
Commelinaceae	*Tradescantia occidentalis*	D. Roth
Commelinaceae	*Tradescantia occidentalis*	J. Fairchild
Commelinaceae	*Tradescantia occidentalis*	J.M. Rominger
Commelinaceae	*Tradescantia occidentalis*	J.W. Brewer
Cupressaceae	*Juniperus osteosperma*	D. Roth
Cupressaceae	*Juniperus osteosperma*	J. Fairchild
Cupressaceae	*Juniperus osteosperma*	M. Skougard and G. Nebeker
Cyperaceae	*Eleocharis palustris*	D. Roth
Cyperaceae	*Eleocharis palustris*	J. Fairchild
Cyperaceae	*Eleocharis palustris*	J. Fairchild
Cyperaceae	*Scirpus pungens*	D. Roth
Elaeagnaceae	*Elaeagnus angustifolia*	D. Roth
Elaeagnaceae	*Elaeagnus angustifolia*	D. Roth
Elaeagnaceae	*Elaeagnus angustifolia*	J. Fairchild
Elaeagnaceae	*Shepherdia rotundifolia*	J. Fairchild
Elaeagnaceae	*Shepherdia rotundifolia*	M. Skougard and G. Nebeker
Ephedraceae	*Ephedra viridis*	D. Roth
Ephedraceae	*Ephedra viridis*	D. Roth
Ephedraceae	*Ephedra viridis*	J. Fairchild
Ephedraceae	*Ephedra viridis*	M. Skougard and G. Nebeker
Equisetaceae	*Equisetum laevigatum*	D. Roth
Euphorbiaceae	*Chamaesyce glyptosperma*	D. Roth
Euphorbiaceae	*Chamaesyce micromera*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	M. Skougard and G. Nebeker
Fabaceae	*Astragalus lentiginosus var. palans*	D. Roth
Fabaceae	*Astragalus zionis*	D. Roth
Fabaceae	*Astragalus zionis*	J. Fairchild
Fabaceae	*Astragalus zionis*	J. Fairchild
Fagaceae	*Quercus harvardii*	D. Roth
Fagaceae	*Quercus turbinella*	D. Roth
Fagaceae	*Quercus turbinella*	D. Roth
Fagaceae	*Quercus turbinella*	J. Fairchild
Gentianaceae	*Centaurium calycosum*	D. Roth

Family Name	Latin Name	Collector
Geraniaceae	*Erodium cicutarium*	D. Roth
Geraniaceae	*Erodium cicutarium*	M. Skougard and G. Nebeker
Hydrangeaceae	*Fendlera rupicola*	D. Roth
Hydrangeaceae	*Fendlera rupicola*	J. Fairchild
Hydrangeaceae	*Fendlera rupicola*	M. Skougard and G. Nebeker
Hydrophyllaceae	*Phacelia ivesiana*	J.W. Brewer
Juncaceae	*Juncus balticus*	D. Roth
Juncaceae	*Juncus balticus*	J. Fairchild
Juncaginaceae	*Triglochin maritima*	J. Fairchild
Linaceae	*Linum aristatum*	J. Fairchild
Linaceae	*Linum aristatum*	M. Wetherill
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	M. Skougard and G. Nebeker
Malvaceae	*Sphaeralcea grossulariaefolia*	D. Roth
Malvaceae	*Sphaeralcea grossulariaefolia*	D. Roth
Malvaceae	*Sphaeralcea grossulariifolia*	D. Roth
Malvaceae	*Sphaeralcea parvifolia*	J. Fairchild
Malvaceae	*Sphaeralcea parvifolia*	J.W. Brewer
Malvaceae	*Sphaeralcea parvifolia*	M. Skougard and G. Nebeker
Nyctaginaceae	*Abronia elliptica*	J. Fairchild
Nyctaginaceae	*Abronia elliptica*	J.W. Brewer
Nyctaginaceae	*Abronia fragrans*	D. Roth
Nyctaginaceae	*Allionia incarnata*	D. Roth
Nyctaginaceae	*Allionia incarnata*	J. Fairchild
Nyctaginaceae	*Mirabilis linearis*	D. Roth
Nyctaginaceae	*Mirabilis multiflora*	D. Roth
Nyctaginaceae	*Mirabilis multiflora*	J. Fairchild
Nyctaginaceae	*Mirabilis multiflora*	J. Fairchild
Nyctaginaceae	*Mirabilis multiflora*	M. Skougard and G. Nebeker
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J. Fairchild
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J.M. Rominger
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	J.W. Brewer
Oleaceae	*Forestiera neomexicana*	D. Roth
Oleaceae	*Forestiera pubescens var. pubescens*	D. Roth
Oleaceae	*Fraxinus anomala*	M. Wetherill
Onagraceae	*Epilobium ciliatum*	D. Roth
Onagraceae	*Oenothera albicaulis*	M. Skougard and G. Nebeker
Onagraceae	*Oenothera caespitosa*	J. Fairchild
Onagraceae	*Oenothera caespitosa*	M. Skougard and G. Nebeker
Onagraceae	*Oenothera caespitosa ssp. macroglottis*	D. Roth
Onagraceae	*Oenothera pallida*	J. Fairchild
Onagraceae	*Oenothera pallida*	J.M. Rominger
Onagraceae	*Oenothera pallida*	M. Skougard and G. Nebeker
Onagraceae	*Oenothera pallida ssp. pallida*	D. Roth

Family Name	Latin Name	Collector
Pinaceae	*Pinus edulis*	D. Roth
Pinaceae	*Pinus edulis*	J. M. Rominger
Pinaceae	*Pinus edulis*	M. Skougard and G. Nebeker
Plantaginaceae	*Plantago patagonica*	D. Roth
Poaceae	*Achnatherum hymenoides*	D. Roth
Poaceae	*Achnatherum hymenoides*	M. Skougard and G. Nebeker
Poaceae	*Agrostis exarata*	M. Skougard and G. Nebeker
Poaceae	*Andropogon gerardii*	D. Roth
Poaceae	*Andropogon hallii*	J. Fairchild
Poaceae	*Aristida purpurea*	D. Roth
Poaceae	*Aristida purpurea var. fendleriana*	J. Fairchild
Poaceae	*Aristida purpurea var. fendleriana*	J. Fairchild
Poaceae	*Bouteloua barbata*	D. Roth
Poaceae	*Bouteloua barbata*	J. Fairchild
Poaceae	*Bouteloua curtipendula*	D. Roth
Poaceae	*Bouteloua curtipendula*	M. Skougard and G. Nebeker
Poaceae	*Bouteloua gracilis*	D. Roth
Poaceae	*Bromus rubens*	J. Fairchild
Poaceae	*Bromus tectorum*	D. Roth
Poaceae	*Bromus tectorum*	J. Fairchild
Poaceae	*Bromus tectorum*	M. Skougard and G. Nebeker
Poaceae	*Elymus elymoides ssp. elymoides*	D. Roth
Poaceae	*Elymus elymoides ssp. elymoides*	J. Fairchild
Poaceae	*Elymus elymoides ssp. elymoides*	M. Skougard and G. Nebeker
Poaceae	*Eragrostis pectinacea*	D. Roth
Poaceae	*Hesperostipa neomexicana*	D. Roth
Poaceae	*Hordeum murinum ssp. glaucum*	D. Roth
Poaceae	*Hordeum murinum ssp. glaucum*	D. Roth
Poaceae	*Lycurus phleoides*	J. Fairchild
Poaceae	*Monroa squarrosa*	J. Fairchild
Poaceae	*Monroa squarrosa*	J. Fairchild
Poaceae	*Monroa squarrosa*	D. Roth
Poaceae	*Muhlenbergia curtifolia*	J.M. Rominger
Poaceae	*Muhlenbergia thurberi*	D. Roth
Poaceae	*Muhlenbergia thurberi*	J. Fairchild
Poaceae	*Poa fendleriana*	D. Roth
Poaceae	*Poa fendleriana*	D. Roth
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	M. Wetherill
Poaceae	*Polypogon interruptus*	D. Roth
Poaceae	*Polypogon monspeliensis*	D. Roth
Poaceae	*Polypogon monspeliensis*	J. Fairchild
Poaceae	*Polypogon monspeliensis*	M. Skougard and G. Nebeker
Poaceae	*Sporobolus airoides*	D. Roth

Family Name	Latin Name	Collector
Poaceae	*Sporobolus airoides*	D. Roth
Poaceae	*Sporobolus airoides*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J.M. Rominger
Poaceae	*Sporobolus cryptandrus*	M. Skougard and G. Nebeker
Poaceae	*Vulpia octoflora*	D. Roth
Poaceae	*Vulpia octoflora*	J. Fairchild
Polemoniaceae	*Gilia leptomeria*	M. Skougard and G. Nebeker
Polemoniaceae	*Ipomopsis aggregata*	D. Roth
Polemoniaceae	*Ipomopsis aggregata*	D. Roth
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	J. Fairchild
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	M. Skougard and G. Nebeker
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J. Fairchild
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J. Fairchild
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	J.M. Rominger
Polygonaceae	*Eriogonum corymbosum*	D. Roth
Polygonaceae	*Eriogonum corymbosum*	J. Fairchild
Polygonaceae	*Eriogonum umbellatum*	J. Fairchild
Polygonaceae	*Eriogonum umbellatum*	J.M. Rominger
Polygonaceae	*Eriogonum umbellatum*	J.W. Brewer
Portulacaceae	*Portulaca halimoides*	D. Roth
Portulacaceae	*Portulaca oleracea*	D. Roth
Portulacaceae	*Portulaca oleracea*	J. Fairchild
Portulacaceae	*Talinum brevifolium*	J. Fairchild
Portulacaceae	*Talinum brevifolium*	M. Skougard and G. Nebeker
Portulacaceae	*Talinum confertiflorum*	D. Roth
Pteridaceae	*Adiantum capillus-veneris*	D. Roth
Ranunculaceae	*Clematis ligusticifolia*	D. Roth
Ranunculaceae	*Ranunculus cymbalaria*	D. Roth
Ranunculaceae	*Ranunculus cymbalaria*	J. Fairchild
Ranunculaceae	*Ranunculus cymbalaria*	J. Fairchild
Ranunculaceae	*Ranunculus cymbalaria*	M. Wetherill
Rosaceae	*Cercocarpus intricatus*	D. Roth
Rosaceae	*Cercocarpus intricatus*	D. Roth
Rosaceae	*Cercocarpus intricatus*	J. Fairchild
Rosaceae	*Cercocarpus intricatus*	J.W. Brewer
Rosaceae	*Cercocarpus intricatus*	M. Skougard and G. Nebeker
Rosaceae	*Cercocarpus intricatus*	M. Wetherill
Rosaceae	*Fallugia paradoxa*	J. Fairchild
Rosaceae	*Purshia stansburiana*	D. Roth
Salicaceae	*Populus angustifolia*	J. Fairchild
Salicaceae	*Populus fremontii*	D. Roth
Salicaceae	*Populus fremontii*	M. Skougard and G. Nebeker
Salicaceae	*Salix exigua*	M. Skougard and G. Nebeker
Salicaceae	*Salix gooddingii*	D. Roth

Family Name	Latin Name	Collector
Scrophulariaceae	*Castilleja linariifolia*	D. Roth
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	M. Skougard and G. Nebeker
Solanaceae	*Chamaesaracha coronopus*	M. Skougard and G. Nebeker
Solanaceae	*Datura wrightii*	D. Roth
Solanaceae	*Datura wrightii*	J. Fairchild
Solanaceae	*Lycium pallidum*	D. Roth
Solanaceae	*Lycium pallidum*	J. Fairchild
Solanaceae	*Nicotiana attenuata*	J.M. Brotherson
Solanaceae	*Physalis hederifolia var. fendleri*	J. Fairchild
Solanaceae	*Physalis hederifolia var. fendleri*	M. Skougard and G. Nebeker
Sparganiaceae	*Sparganium eurycarpum*	J. Fairchild
Tamaricaceae	*Tamarix ramosissima*	D. Roth
Tamaricaceae	*Tamarix ramosissima*	J. Fairchild
Ulmaceae	*Celtis laevigata var. reticulata*	D. Roth
Urticaceae	*Parietaria pensylvanica*	M. Skougard and G. Nebeker
Zygophyllaceae	*Tribulus terrestris*	D. Roth

Appendix 1C. Voucher specimens and their collectors for Keet Seel Ruin; list includes collections published by Brotherson, J.D., G. Nebeker, M. Skougard, and J. Fairchild (1978) and this study (D. Roth).

Family Name	Latin Name	Collector
Aceraceae	*Acer negundo*	J. W. Brewer
Aceraceae	*Acer negundo*	M. Skougard and G. Nebeker
Agavaceae	*Yucca angustissima*	J.W. Brewer
Agavaceae	*Yucca angustissima*	M. Skougard and G. Nebeker
Amaranthaceae	*Amaranthus hypochondriacus*	J. Fairchild
Amaranthaceae	*Amaranthus retroflexus*	D. Roth
Anacardiaceae	*Rhus trilobata*	M. Skougard and G. Nebeker
Asclepiadaceae	*Funastrum heterophyllum*	J. Fairchild
Asclepiadaceae	*Funastrum heterophyllum*	M. Wetherill
Asteraceae	*Achillea millefolium*	M. Skougard and G. Nebeker
Asteraceae	*Ambrosia acanthicarpa*	J. Fairchild
Asteraceae	*Ambrosia acanthicarpa*	J. Fairchild
Asteraceae	*Ambrosia artemisiifolia*	J. Fairchild
Asteraceae	*Artemisia dracunculus*	J. Fairchild
Asteraceae	*Artemisia dracunculus*	J. W. Brewer
Asteraceae	*Artemisia frigida*	J. Fairchild
Asteraceae	*Artemisia frigida*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia frigida*	M. Wetherill
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Artemisia ludoviciana*	J. Fairchild
Asteraceae	*Artemisia nova*	J. Fairchild
Asteraceae	*Artemisia tridentata*	M. Skougard and G. Nebeker
Asteraceae	*Artemisia tridentata*	M. Wetherill
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia californica*	J. Fairchild
Asteraceae	*Brickellia grandiflora*	J. Fairchild
Asteraceae	*Brickellia microphylla var. scabra*	J. Fairchild
Asteraceae	*Chaenactis stevioides*	M. Skougard and G. Nebeker
Asteraceae	*Chrysothamnus greenei*	D. Roth
Asteraceae	*Chrysothamnus pulchellus*	J. W. Brewer
Asteraceae	*Chrysothamnus viscidiflorus*	J. Fairchild
Asteraceae	*Cirsium calcareum*	J. Fairchild
Asteraceae	*Cirsium vulgare*	D. Roth
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	J. Fairchild
Asteraceae	*Erigeron concinnus*	J. Fairchild
Asteraceae	*Erigeron concinnus*	J. Fairchild
Asteraceae	*Erigeron concinnus*	M. Skougard and G. Nebeker
Asteraceae	*Erigeron divergens*	D. Roth
Asteraceae	*Gutierrezia sarothrae*	J. Fairchild

Family Name	Latin Name	Collector
Asteraceae	*Gutierrezia sarothrae*	M. Skougard and G. Nebeker
Asteraceae	*Gutierrezia sarothrae*	M. Wetherill
Asteraceae	*Hesperodoria scopulorum*	D. Roth
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	J. Fairchild
Asteraceae	*Heterotheca villosa*	M. Skougard and G. Nebeker
Asteraceae	*Hymenopappus filifolius*	J. Fairchild
Asteraceae	*Hymenopappus filifolius*	J. Fairchild
Asteraceae	*Hymenopappus filifolius*	M. Skougard and G. Nebeker
Asteraceae	*Lactuca tatarica var. pulchella*	J. Fairchild
Asteraceae	*Lactuca tatarica var. pulchella*	J. W. Brewer
Asteraceae	*Lactuca tatarica var. pulchella*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera canescens var. glabra*	J. M. Rominger
Asteraceae	*Machaeranthera grindelioides*	J. Fairchild
Asteraceae	*Machaeranthera grindelioides*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	J. W. Brewer
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Skougard and G. Nebeker
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	M. Wetherill
Asteraceae	*Packera multilobata*	J. Fairchild
Asteraceae	*Packera multilobata*	J. W. Brewer
Asteraceae	*Tetradymia canescens*	D. Roth
Asteraceae	*Tetradymia canescens*	J. Fairchild
Asteraceae	*Tetradymia canescens*	M. Skougard and G. Nebeker
Asteraceae	*Xanthium strumarium*	D. Roth
Berberidaceae	*Mahonia repens*	E. Jackson
Berberidaceae	*Mahonia repens*	J. W. Brewer
Berberidaceae	*Mahonia repens*	M. Skougard and G. Nebeker
Berberidaceae	*Mahonia repens*	M. Wetherill
Boraginaceae	*Cryptantha flava*	J. Fairchild
Boraginaceae	*Cryptantha flava*	M. Skougard and G. Nebeker
Boraginaceae	*Lappula occidentalis var. occidentalis*	D. Roth
Brassicaceae	*Capsella bursa-pastoris*	D. Roth
Brassicaceae	*Chorispora tenella*	D. Roth
Brassicaceae	*Descurainia pinnata*	D. Roth
Brassicaceae	*Descurainia pinnata*	D. Roth
Brassicaceae	*Descurainia pinnata*	J. Fairchild
Brassicaceae	*Descurainia pinnata*	J.W. Brewer
Brassicaceae	*Descurainia sophia*	D. Roth
Brassicaceae	*Descurainia sophia*	D. Roth
Brassicaceae	*Descurainia sophia*	E. Lehnert
Brassicaceae	*Descurainia sophia*	M. Skougard and G. Nebeker
Brassicaceae	*Erysimum capitatum var. capitatum*	J. Fairchild

Family Name	Latin Name	Collector
Brassicaceae	*Erysimum capitatum var. capitatum*	J.W. Brewer
Brassicaceae	*Erysimum capitatum var. capitatum*	J.W. Brewer
Brassicaceae	*Erysimum capitatum var. capitatum*	M. Skougard and G. Nebeker
Brassicaceae	*Lepidium montanum*	D. Roth
Brassicaceae	*Lepidium montanum*	J. Fairchild
Brassicaceae	*Lepidium montanum*	M. Skougard and G. Nebeker
Brassicaceae	*Sisymbrium altissimum*	D. Roth
Brassicaceae	*Sisymbrium altissimum*	J. Fairchild
Brassicaceae	*Sisymbrium altissimum*	J.M. Rominger
Brassicaceae	*Streptanthella longirostris*	M. Skougard and G. Nebeker
Brassicaceae	*Thelypodium integrifolium*	J. Fairchild
Cactaceae	*Echinocereus fendleri*	J. W. Brewer
Cactaceae	*Escobaria vivipara var. vivipara*	J. Fairchild
Cactaceae	*Opuntia erinacea*	J. W. Brewer
Cactaceae	*Opuntia phaeacantha*	D. Roth
Cactaceae	*Opuntia polyacantha*	J. Fairchild
Cactaceae	*Opuntia polyacantha*	M. Skougard and G. Nebeker
Cactaceae	*Sclerocactus whipplei*	J. W. Brewer
Capparaceae	*Cleome serrulata*	J. Fairchild
Capparaceae	*Cleome serrulata*	J. W. Brewer
Capparaceae	*Cleome serrulata*	M. Wetherill
Caryophyllaceae	*Arenaria eastwoodiae*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	J. Fairchild
Chenopodiaceae	*Atriplex canescens*	M. Wetherill
Chenopodiaceae	*Chenopodium album*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	J. Fairchild
Chenopodiaceae	*Chenopodium fremontii*	M. Wetherill
Chenopodiaceae	*Chenopodium glaucum*	J. Fairchild
Chenopodiaceae	*Chenopodium glaucum*	M. Skougard and G. Nebeker
Chenopodiaceae	*Chenopodium leptophyllum*	D. Roth
Chenopodiaceae	*Chenopodium pratericola*	J. Fairchild
Chenopodiaceae	*Salsola tragus*	M. Skougard and G. Nebeker
Commelinaceae	*Tradescantia occidentalis*	J. Fairchild
Commelinaceae	*Tradescantia occidentalis*	J.M. Rominger
Commelinaceae	*Tradescantia occidentalis*	J.W. Brewer
Cupressaceae	*Juniperus osteosperma*	J. Fairchild
Cupressaceae	*Juniperus osteosperma*	M. Skougard and G. Nebeker
Cyperaceae	*Carex pellita*	D. Roth
Cyperaceae	*Carex pellita*	D. Roth
Elaeagnaceae	*Shepherdia rotundifolia*	J. Fairchild
Elaeagnaceae	*Shepherdia rotundifolia*	M. Skougard and G. Nebeker
Ephedraceae	*Ephedra viridis*	J. Fairchild
Ephedraceae	*Ephedra viridis*	M. Skougard and G. Nebeker
Euphorbiaceae	*Chamaesyce glyptosperma*	D. Roth
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	J. Fairchild
Fabaceae	*Astragalus lentiginosus*	M. Skougard and G. Nebeker

Family Name	Latin Name	Collector
Fabaceae	*Astragalus zionis*	J. Fairchild
Fabaceae	*Astragalus zionis*	J. Fairchild
Fagaceae	*Quercus gambelii*	J. Fairchild
Fagaceae	*Quercus gambelii*	J.W. Brewer
Fagaceae	*Quercus gambelii*	M. Skougard and G. Nebeker
Geraniaceae	*Erodium cicutarium*	D. Roth
Geraniaceae	*Erodium cicutarium*	M. Skougard and G. Nebeker
Grossulariaceae	*Ribes cereum*	D. Roth
Grossulariaceae	*Ribes cereum*	J. Fairchild
Grossulariaceae	*Ribes cereum*	J. Fairchild
Grossulariaceae	*Ribes leptanthum*	J. Fairchild
Grossulariaceae	*Ribes leptanthum*	J. Fairchild
Grossulariaceae	*Ribes viscosissimum*	M. Skougard and G. Nebeker
Hydrangeaceae	*Fendlera rupicola*	J. Fairchild
Hydrangeaceae	*Fendlera rupicola*	M. Skougard and G. Nebeker
Hydrophyllaceae	*Phacelia ivesiana*	J.W. Brewer
Juglandaceae	*Juglans major*	D. Roth
Juncaceae	*Juncus balticus*	D. Roth
Liliaceae	*Maianthemum stellatum*	J. Fairchild
Liliaceae	*Maianthemum stellatum*	M. Skougard and G. Nebeker
Liliaceae	*Maianthemum stellatum*	M. Skougard and G. Nebeker
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	J. Fairchild
Malvaceae	*Sphaeralcea coccinea*	M. Skougard and G. Nebeker
Malvaceae	*Sphaeralcea parvifolia*	J. Fairchild
Malvaceae	*Sphaeralcea parvifolia*	J.W. Brewer
Malvaceae	*Sphaeralcea parvifolia*	M. Skougard and G. Nebeker
Nyctaginaceae	*Abronia elliptica*	J. Fairchild
Nyctaginaceae	*Abronia elliptica*	J.W. Brewer
Nyctaginaceae	*Mirabilis comata*	M. Skougard and G. Nebeker
Nyctaginaceae	*Mirabilis oxybaphoides*	D. Roth
Nyctaginaceae	*Mirabilis oxybaphoides*	J. Fairchild
Onagraceae	*Epilobium hornemannii*	J. Fairchild
Onagraceae	*Oenothera caespitosa*	J. Fairchild
Onagraceae	*Oenothera caespitosa*	M. Skougard and G. Nebeker
Pinaceae	*Pinus edulis*	J. M. Rominger
Pinaceae	*Pinus edulis*	M. Skougard and G. Nebeker
Pinaceae	*Pseudotsuga menziesii*	M. Skougard and G. Nebeker
Poaceae	*Achnatherum hymenoides*	M. Skougard and G. Nebeker
Poaceae	*Alopecurus aequalis*	M. Skougard and G. Nebeker
Poaceae	*Bromus carinatus*	M. Skougard and G. Nebeker
Poaceae	*Bromus rubens*	J. Fairchild
Poaceae	*Bromus tectorum*	D. Roth
Poaceae	*Bromus tectorum*	J. Fairchild
Poaceae	*Bromus tectorum*	M. Skougard and G. Nebeker
Poaceae	*Elymus caninus*	J. Fairchild
Poaceae	*Elymus caninus*	M. Skougard and G. Nebeker

Family Name	Latin Name	Collector
Poaceae	*Elymus elymoides ssp. elymoides*	J. Fairchild
Poaceae	*Elymus elymoides ssp. elymoides*	M. Skougard and G. Nebeker
Poaceae	*Hesperostipa comata ssp. comata*	J. Fairchild
Poaceae	*Hordeum murinum ssp. leporinum*	D. Roth
Poaceae	*Monroa squarrosa*	D. Roth
Poaceae	*Muhlenbergia andina*	D. Roth
Poaceae	*Poa fendleriana*	M. Skougard and G. Nebeker
Poaceae	*Poa fendleriana*	M. Wetherill
Poaceae	*Poa fendleriana*	M. Wetherill
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	J. Fairchild
Poaceae	*Poa fendleriana ssp. longiligula*	M. Wetherill
Poaceae	*Poa pratensis*	J. Fairchild
Poaceae	*Poa pratensis*	M. Skougard and G. Nebeker
Poaceae	*Polypogon monspeliensis*	J. Fairchild
Poaceae	*Polypogon monspeliensis*	M. Skougard and G. Nebeker
Poaceae	*Polypogon viridis*	J. Fairchild
Poaceae	*Polypogon viridis*	J. Fairchild
Poaceae	*Polypogon viridis*	M. Skougard and G. Nebeker
Poaceae	*Puccinellia nuttalliana*	J. Fairchild
Poaceae	*Sporobolus airoides*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J. Fairchild
Poaceae	*Sporobolus cryptandrus*	J.M. Rominger
Poaceae	*Sporobolus cryptandrus*	M. Skougard and G. Nebeker
Poaceae	*Sporobolus flexuosus*	D. Roth
Poaceae	*Vulpia octoflora*	J. Fairchild
Polemoniaceae	*Gilia leptomeria*	M. Skougard and G. Nebeker
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	J. Fairchild
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	M. Skougard and G. Nebeker
Polemoniaceae	*Leptodactylon pungens*	M. Skougard and G. Nebeker
Polemoniaceae	*Phlox longifolia*	M. Skougard and G. Nebeker
Polygonaceae	*Eriogonum microthecum*	D. Roth
Portulacaceae	*Portulaca oleracea*	J. Fairchild
Portulacaceae	*Portulaca oleracea*	J. Fairchild
Ranunculaceae	*Clematis ligusticifolia*	D. Roth
Rosaceae	*Cercocarpus intricatus*	J. Fairchild
Rosaceae	*Cercocarpus intricatus*	J.W. Brewer
Rosaceae	*Cercocarpus intricatus*	M. Skougard and G. Nebeker
Rosaceae	*Cercocarpus intricatus*	M. Wetherill
Rosaceae	*Prunus emarginata*	J. Fairchild
Rosaceae	*Prunus emarginata*	M. Skougard and G. Nebeker
Rosaceae	*Prunus munsoniana*	D. Roth
Rosaceae	*Prunus munsoniana*	D. Roth
Rosaceae	*Purshia tridentata*	M. Skougard and G. Nebeker
Rubiaceae	*Galium aparine*	J. Fairchild
Rubiaceae	*Galium triflorum*	D. Roth
Rubiaceae	*Kelloggia galioides*	J. Fairchild

Family Name	Latin Name	Collector
Salicaceae	*Salix exigua*	D. Roth
Salicaceae	*Salix gooddingii*	J. Fairchild
Salicaceae	*Salix lucida ssp. lasiandra*	D. Roth
Santalaceae	*Comandra umbellata ssp. pallida*	J. Fairchild
Santalaceae	*Comandra umbellata ssp. pallida*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	J. Fairchild
Scrophulariaceae	*Castilleja linariifolia*	M. Skougard and G. Nebeker
Scrophulariaceae	*Mimulus eastwoodiae*	J. Fairchild
Scrophulariaceae	*Mimulus eastwoodiae*	J. Fairchild
Scrophulariaceae	*Penstemon rostriflorus*	D. Roth
Solanaceae	*Datura wrightii*	J. Fairchild
Solanaceae	*Physalis hederifolia*	J. Fairchild
Solanaceae	*Solanum jamesii*	D. Roth
Solanaceae	*Solanum jamesii*	J. Fairchild

Appendix 2A. Betatakin unit vascular plant species list. N= Native, I = Introduced, C = Cultivated, SWEMP = Southwest Exotic Plant Mapping Program

Family Name	Latin Name	Status
Aceraceae	*Acer glabrum*	N
Aceraceae	*Acer negundo*	N
Agavaceae	*Yucca angustissima*	N
Agavaceae	*Yucca baccata*	N
Anacardiaceae	*Rhus trilobata*	N
Anacardiaceae	*Toxicodendron radicans*	N
Apiaceae	*Cymopterus newberryi*	N
Apocynaceae	*Apocynum X floribundum*	N
Asteraceae	*Achillea millefolium*	N/I
Asteraceae	*Antennaria marginata*	N
Asteraceae	*Antennaria neglecta*	N
Asteraceae	*Antennaria parvifolia*	N
Asteraceae	*Artemisia campestris*	N
Asteraceae	*Artemisia campestris ssp. borealis var. scouleriana*	N
Asteraceae	*Artemisia dracunculus*	N
Asteraceae	*Artemisia frigida*	N
Asteraceae	*Artemisia ludoviciana*	N
Asteraceae	*Artemisia nova*	N
Asteraceae	*Artemisia tridentata*	N
Asteraceae	*Brickellia californica*	N
Asteraceae	*Brickellia microphylla var. scabra*	N
Asteraceae	*Chaenactis stevioides*	N
Asteraceae	*Chaetopappa ericoides*	N
Asteraceae	*Chrysothamnus depressus*	N
Asteraceae	*Chrysothamnus pulchellus*	N
Asteraceae	*Chrysothamnus viscidiflorus*	N
Asteraceae	*Cirsium calcareum*	N
Asteraceae	*Cirsium vulgare*	I, SWEMP
Asteraceae	*Conyza canadensis*	N, SWEMP
Asteraceae	*Erigeron concinnus*	N
Asteraceae	*Erigeron divergens*	N
Asteraceae	*Erigeron flagellaris*	N
Asteraceae	*Erigeron glabellus*	N
Asteraceae	*Erigeron speciosus*	N
Asteraceae	*Erigeron speciosus var. macranthus*	N
Asteraceae	*Erigeron utahensis*	N

Family Name	Latin Name	Status
Asteraceae	*Euthamia occidentalis*	N
Asteraceae	*Gaillardia pinnatifida*	N
Asteraceae	*Gutierrezia microcephala*	N
Asteraceae	*Gutierrezia sarothrae*	N
Asteraceae	*Hesperodoria scopulorum*	N
Asteraceae	*Heterotheca villosa*	N
Asteraceae	*Hymenopappus filifolius*	N
Asteraceae	*Hymenopappus filifolius var. lugens*	N
Asteraceae	*Hymenoxys bigelovii*	N
Asteraceae	*Hymenoxys richardsonii*	N
Asteraceae	*Lactuca tatarica var. pulchella*	N
Asteraceae	*Machaeranthera canescens ssp. canescens var. incana*	N
Asteraceae	*Machaeranthera canescens var. glabra*	N
Asteraceae	*Machaeranthera grindelioides*	N
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	N
Asteraceae	*Malacothrix sonchoides*	N
Asteraceae	*Packera multilobata*	N
Asteraceae	*Psilostrophe sparsiflora*	N
Asteraceae	*Solidago canadensis*	N
Asteraceae	*Sonchus asper*	I, SWEMP
Asteraceae	*Stephanomeria exigua*	N
Asteraceae	*Stephanomeria minor var. minor*	N
Asteraceae	*Stephanomeria thurberi*	N
Asteraceae	*Taraxacum officinale*	N/I
Asteraceae	*Tetradymia canescens*	N
Asteraceae	*Tetraneuris acaulis var. acaulis*	N
Asteraceae	*Tetraneuris ivesiana*	N
Asteraceae	*Townsendia incana*	N
Berberidaceae	*Mahonia repens*	N
Betulaceae	*Betula occidentalis*	N
Boraginaceae	*Cryptantha cinerea var. jamesii*	N
Boraginaceae	*Cryptantha confertiflora*	N
Boraginaceae	*Cryptantha crassisepala*	N
Boraginaceae	*Cryptantha flava*	N
Boraginaceae	*Cryptantha pterocarya*	N
Boraginaceae	*Lappula occidentalis*	N
Boraginaceae	*Lappula occidentalis var. occidentalis*	N
Boraginaceae	*Lithospermum multiflorum*	N
Brassicaceae	*Arabis perennans*	N

Family Name	Latin Name	Status
Brassicaceae	*Arabis pulchra*	N
Brassicaceae	*Chorispora tenella*	I, SWEMP
Brassicaceae	*Descurainia pinnata*	N
Brassicaceae	*Descurainia sophia*	I, SWEMP
Brassicaceae	*Erysimum capitatum var. capitatum*	N
Brassicaceae	*Lepidium montanum*	N
Brassicaceae	*Lepidium montanum var. jonesii*	N
Brassicaceae	*Lesquerella intermedia*	N
Brassicaceae	*Lesquerella ludoviciana*	N
Brassicaceae	*Lesquerella rectipes*	N
Brassicaceae	*Sisymbrium altissimum*	I
Brassicaceae	*Streptanthella longirostris*	N
Brassicaceae	*Streptanthus cordatus*	N
Brassicaceae	*Thlaspi montanum var. fendleri*	N
Cactaceae	*Echinocereus fendleri*	N
Cactaceae	*Echinocereus triglochidiatus*	N
Cactaceae	*Opuntia erinacea*	N
Cactaceae	*Opuntia fragilis*	N
Cactaceae	*Opuntia polyacantha*	N
Cactaceae	*Sclerocactus parviflorus*	N
Cactaceae	*Sclerocactus parviflorus ssp. terrae-canyonae*	N
Cactaceae	*Sclerocactus whipplei*	N
Capparaceae	*Cleome serrulata*	N
Caprifoliaceae	*Symphoricarpos oreophilus*	N
Caprifoliaceae	*Symphoricarpos oreophilus var. utahensis*	N
Caryophyllaceae	*Arenaria eastwoodiae*	N
Chenopodiaceae	*Atriplex canescens*	N
Chenopodiaceae	*Chenopodium album*	N
Chenopodiaceae	*Chenopodium fremontii*	N
Chenopodiaceae	*Salsola tragus*	I, SWEMP
Commelinaceae	*Tradescantia occidentalis*	N
Cornaceae	*Cornus sericea ssp. sericea*	N
Crassulaceae	*Sedum stenopetalum*	N
Cupressaceae	*Juniperus osteosperma*	N
Cyperaceae	*Carex occidentalis*	N
Cyperaceae	*Carex rossii*	N
Cyperaceae	*Carex vallicola*	N
Cyperaceae	*Eleocharis palustris*	N
Elaeagnaceae	*Elaeagnus angustifolia*	I, SWEMP

Family Name	Latin Name	Status
Elaeagnaceae	*Shepherdia rotundifolia*	N
Ephedraceae	*Ephedra viridis*	N
Equisetaceae	*Equisetum hyemale*	N
Ericaceae	*Arctostaphylos pungens*	N
Euphorbiaceae	*Euphorbia brachycera*	N
Fabaceae	*Astragalus amphioxys*	N
Fabaceae	*Astragalus ceramicus*	N
Fabaceae	*Astragalus ceramicus var. ceramicus*	N
Fabaceae	*Astragalus lentiginosus*	N
Fabaceae	*Astragalus mollissimus var. thompsoniae*	N
Fabaceae	*Astragalus sesquiflorus*	N
Fabaceae	*Astragalus zionis*	N
Fabaceae	*Lathyrus brachycalyx*	N
Fabaceae	*Lathyrus lanszwertii var. leucanthus*	N
Fabaceae	*Lupinus argenteus*	N
Fabaceae	*Medicago sativa*	I
Fabaceae	*Melilotus alba*	I, SWEMP
Fabaceae	*Melilotus officinalis*	I, SWEMP
Fagaceae	*Quercus gambelii*	N
Fumariaceae	*Corydalis aurea*	N
Geraniaceae	*Erodium cicutarium*	I, SWEMP
Geraniaceae	*Geranium atropurpureum*	N
Geraniaceae	*Geranium caespitosum*	N
Grossulariaceae	*Ribes cereum*	N
Grossulariaceae	*Ribes viscosissimum*	N
Hydrangeaceae	*Fendlera rupicola*	N
Hydrophyllaceae	*Phacelia crenulata var. corrugata*	N
Hydrophyllaceae	*Phacelia ivesiana*	N
Juncaceae	*Juncus balticus*	N
Lamiaceae	*Dracocephalum parviflorum*	N
Liliaceae	*Allium macropetalum*	N
Liliaceae	*Calochortus nuttallii*	N
Liliaceae	*Fritillaria atropurpurea*	N
Liliaceae	*Maianthemum stellatum*	N
Linaceae	*Linum perenne*	I
Loasaceae	*Mentzelia albicaulis*	N
Malvaceae	*Sidalcea neomexicana*	N
Malvaceae	*Sphaeralcea coccinea*	N
Malvaceae	*Sphaeralcea parvifolia*	N

Family Name	Latin Name	Status
Nyctaginaceae	*Abronia elliptica*	N
Nyctaginaceae	*Abronia fragrans*	N
Nyctaginaceae	*Mirabilis linearis*	N
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	N
Onagraceae	*Oenothera albicaulis*	N
Onagraceae	*Oenothera caespitosa*	N
Onagraceae	*Oenothera elata*	N
Onagraceae	*Oenothera elata ssp. hookeri*	N
Onagraceae	*Oenothera longissima*	N
Orchidaceae	*Platanthera zothecina*	N
Pinaceae	*Pinus edulis*	N
Pinaceae	*Pseudotsuga menziesii*	N
Plantaginaceae	*Plantago patagonica*	N
Poaceae	*Achnatherum hymenoides*	N
Poaceae	*Aristida arizonica*	N
Poaceae	*Aristida purpurea var. fendleriana*	N
Poaceae	*Bouteloua gracilis*	N
Poaceae	*Bromus carinatus*	N
Poaceae	*Bromus ciliatus*	N
Poaceae	*Bromus marginatus*	N
Poaceae	*Bromus tectorum*	I, SWEMP
Poaceae	*Elymus caninus*	I
Poaceae	*Elymus elymoides ssp. elymoides*	N
Poaceae	*Elymus glaucus*	N
Poaceae	*Glyceria striata*	N
Poaceae	*Hesperostipa comata ssp. comata*	N
Poaceae	*Hordeum murinum ssp. leporinum*	I
Poaceae	*Muhlenbergia andina*	N
Poaceae	*Muhlenbergia minutissima*	N
Poaceae	*Muhlenbergia pungens*	N
Poaceae	*Muhlenbergia thurberi*	N
Poaceae	*Muhlenbergia wrightii*	N
Poaceae	*Piptatherum micranthum*	N
Poaceae	*Poa fendleriana*	N
Poaceae	*Poa fendleriana ssp. longiligula*	N
Poaceae	*Poa pratensis*	N/I
Poaceae	*Polypogon monspeliensis*	I
Poaceae	*Puccinellia nuttalliana*	N
Poaceae	*Sporobolus cryptandrus*	N

Family Name	Latin Name	Status
Poaceae	*Sporobolus flexuosus*	N
Poaceae	*Vulpia octoflora*	N
Polemoniaceae	*Gilia aggregata*	N
Polemoniaceae	*Gilia leptomeria*	N
Polemoniaceae	*Gilia scopulorum*	N
Polemoniaceae	*Gilia subnuda*	N
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	N
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	N
Polemoniaceae	*Leptodactylon pungens*	N
Polemoniaceae	*Phlox austromontana*	N
Polemoniaceae	*Phlox longifolia*	N
Polygonaceae	*Eriogonum alatum*	N
Polygonaceae	*Eriogonum cernuum*	N
Polygonaceae	*Eriogonum microthecum*	N
Polygonaceae	*Eriogonum umbellatum*	N
Polygonaceae	*Eriogonum umbellatum var. cognatum*	N
Polygonaceae	*Polygonum douglasii var. johnstonii*	N
Primulaceae	*Androsace septentrionalis*	N
Ranunculaceae	*Aquilegia micrantha*	N
Ranunculaceae	*Clematis ligusticifolia*	N
Ranunculaceae	*Delphinium nuttallianum*	N
Ranunculaceae	*Delphinium parishii ssp. parishii*	N
Ranunculaceae	*Delphinium scaposum*	N
Ranunculaceae	*Thalictrum fendleri*	N
Rosaceae	*Amelanchier utahensis*	N
Rosaceae	*Cercocarpus intricatus*	N
Rosaceae	*Holodiscus dumosus*	N
Rosaceae	*Prunus virginiana*	N
Rosaceae	*Purshia mexicana*	N
Rosaceae	*Purshia tridentata*	N
Rosaceae	*Rosa woodsii*	N
Rubiaceae	*Galium triflorum*	N
Rubiaceae	*Kelloggia galioides*	N
Salicaceae	*Populus fremontii*	N
Salicaceae	*Populus tremuloides*	N
Salicaceae	*Salix exigua*	N
Salicaceae	*Salix gooddingii*	N
Salicaceae	*Salix lasiolepis*	N
Santalaceae	*Comandra umbellata ssp. pallida*	N

Family Name	Latin Name	Status
Saxifragaceae	*Heuchera parvifolia*	N
Saxifragaceae	*Heuchera rubescens*	N
Scrophulariaceae	*Castilleja linariifolia*	N
Scrophulariaceae	*Cordylanthus wrightii*	N
Scrophulariaceae	*Mimulus eastwoodiae*	N
Scrophulariaceae	*Penstemon ambiguus*	N
Scrophulariaceae	*Penstemon barbatus*	N
Scrophulariaceae	*Penstemon comarrhenus*	N
Scrophulariaceae	*Penstemon eatonii*	N
Scrophulariaceae	*Penstemon virgatus*	N
Solanaceae	*Datura wrightii*	N
Solanaceae	*Physalis hederifolia var. fendleri*	N
Solanaceae	*Solanum triflorum*	N
Valerianaceae	*Valeriana acutiloba*	N
Verbenaceae	*Verbena bracteata*	N
Viscaceae	*Arceuthobium campylopodum*	N
Viscaceae	*Phoradendron juniperinum*	N
Zygophyllaceae	*Tribulus terrestris*	I, SWEMP

Appendix 2B. Inscription House unit vascular plant species list. N= Native, I = Introduced, C = Cultivated, SWEMP = Southwest Exotic Plant Mapping Program

Family Name	Latin Name	Status
Agavaceae	*Yucca angustissima*	N
Agavaceae	*Yucca angustissima var. toftiae*	N
Amaranthaceae	*Amaranthus albus*	N
Anacardiaceae	*Rhus trilobata*	N
Anacardiaceae	*Rhus trilobata var. trilobata*	N
Asclepiadaceae	*Asclepias asperula*	N
Asclepiadaceae	*Asclepias subverticillata*	N
Asclepiadaceae	*Funastrum cynanchoides ssp. cynanchoides*	N
Asteraceae	*Ambrosia acanthicarpa*	N
Asteraceae	*Ambrosia artemisiifolia*	N
Asteraceae	*Artemisia bigelovii*	N
Asteraceae	*Artemisia dracunculus*	N
Asteraceae	*Artemisia frigida*	N
Asteraceae	*Artemisia ludoviciana*	N
Asteraceae	*Brickellia californica*	N
Asteraceae	*Brickellia microphylla var. scabra*	N
Asteraceae	*Chaenactis stevioides*	N
Asteraceae	*Chrysothamnus depressus*	N
Asteraceae	*Chrysothamnus greenei*	N
Asteraceae	*Chrysothamnus pulchellus*	N
Asteraceae	*Chrysothamnus viscidiflorus*	N
Asteraceae	*Conyza canadensis*	N, SWEMP
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. glabrata*	N
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	N
Asteraceae	*Erigeron belladiastrum*	N
Asteraceae	*Erigeron divergens*	N
Asteraceae	*Erigeron flagellaris*	N
Asteraceae	*Erigeron utahensis*	N
Asteraceae	*Gutierrezia microcephala*	N
Asteraceae	*Gutierrezia sarothrae*	N
Asteraceae	*Hesperodoria scopulorum*	N
Asteraceae	*Heterotheca villosa*	N
Asteraceae	*Heterotheca villosa var. villosa*	N
Asteraceae	*Lactuca serriola*	I
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	N
Asteraceae	*Malacothrix sonchoides*	N
Asteraceae	*Pseudognaphalium luteoalbum*	I
Asteraceae	*Psilactis asteroides*	N

Family Name	Latin Name	Status
Asteraceae	*Psilostrophe sparsiflora*	N
Asteraceae	*Senecio spartiodes*	N
Asteraceae	*Sonchus asper*	I, SWEMP
Asteraceae	*Stephanomeria exigua*	N
Asteraceae	*Stephanomeria minor var. minor*	N
Asteraceae	*Taraxacum officinale*	N/I
Asteraceae	*Tetradymia canescens*	N
Asteraceae	*Tetraneuris ivesiana*	N
Asteraceae	*Townsendia incana*	N
Asteraceae	*Verbesina encelioides*	N
Asteraceae	*Xanthium strumarium*	N, SWEMP
Boraginaceae	*Cryptantha barbigera*	N
Boraginaceae	*Cryptantha capitata*	N
Boraginaceae	*Cryptantha cinerea var. jamesii*	N
Boraginaceae	*Cryptantha fulvocanescens*	N
Boraginaceae	*Cryptantha pterocarya*	N
Boraginaceae	*Heliotropium convolvulaceum*	N
Brassicaceae	*Arabis perennans*	N
Brassicaceae	*Descurainia sophia*	I, SWEMP
Brassicaceae	*Lepidium montanum*	N
Brassicaceae	*Streptanthella longirostris*	N
Cactaceae	*Echinocereus fendleri*	N
Cactaceae	*Echinocereus triglochidiatus*	N
Cactaceae	*Opuntia erinacea*	N
Cactaceae	*Opuntia phaeacantha*	N
Cactaceae	*Opuntia polyacantha*	N
Cactaceae	*Opuntia whipplei*	N
Cactaceae	*Sclerocactus parviflorus ssp. terrae-canyonae*	N
Cactaceae	*Sclerocactus whipplei*	N
Capparaceae	*Cleome serrulata*	N
Caryophyllaceae	*Arenaria eastwoodiae*	N
Chenopodiaceae	*Atriplex canescens*	N
Chenopodiaceae	*Chenopodium album*	N
Chenopodiaceae	*Chenopodium fremontii*	N
Chenopodiaceae	*Chenopodium glaucum*	I
Chenopodiaceae	*Chenopodium leptophyllum*	N
Chenopodiaceae	*Chenopodium pratericola*	N
Chenopodiaceae	*Kochia scoparia*	I, SWEMP
Chenopodiaceae	*Salsola tragus*	I, SWEMP
Chenopodiaceae	*Sarcobatus vermiculatus*	N
Commelinaceae	*Tradescantia occidentalis*	N
Cupressaceae	*Juniperus osteosperma*	N
Cyperaceae	*Eleocharis palustris*	N
Cyperaceae	*Scirpus pungens*	N
Elaeagnaceae	*Elaeagnus angustifolia*	I, SWEMP

Family Name	Latin Name	Status
Elaeagnaceae	*Shepherdia rotundifolia*	N
Ephedraceae	*Ephedra viridis*	N
Equisetaceae	*Equisetum laevigatum*	N
Euphorbiaceae	*Chamaesyce glyptosperma*	N
Euphorbiaceae	*Chamaesyce micromera*	N
Fabaceae	*Astragalus lentiginosus*	N
Fabaceae	*Astragalus lentiginosus var. palans*	N
Fabaceae	*Astragalus zionis*	N
Fagaceae	*Quercus harvardii*	N
Fagaceae	*Quercus turbinella*	N
Gentianaceae	*Centaurium calycosum*	N
Geraniaceae	*Erodium cicutarium*	I, SWEMP
Hydrangeaceae	*Fendlera rupicola*	N
Hydrophyllaceae	*Phacelia ivesiana*	N
Juncaceae	*Juncus balticus*	N
Juncaginaceae	*Triglochin maritima*	N
Linaceae	*Linum aristatum*	N
Malvaceae	*Sphaeralcea coccinea*	N
Malvaceae	*Sphaeralcea grossulariaefolia*	N
Malvaceae	*Sphaeralcea parvifolia*	N
Nyctaginaceae	*Abronia elliptica*	N
Nyctaginaceae	*Abronia fragrans*	N
Nyctaginaceae	*Allionia incarnata*	N
Nyctaginaceae	*Mirabilis linearis*	N
Nyctaginaceae	*Mirabilis multiflora*	N
Nyctaginaceae	*Tripterocalyx carnea var. wootonii*	N
Oleaceae	*Forestiera neomexicana*	N
Oleaceae	*Forestiera pubescens var. pubescens*	N
Oleaceae	*Fraxinus anomala*	N
Onagraceae	*Epilobium ciliatum*	N
Onagraceae	*Oenothera albicaulis*	N
Onagraceae	*Oenothera caespitosa*	N
Onagraceae	*Oenothera caespitosa ssp. macroglottis*	N
Onagraceae	*Oenothera pallida*	N
Onagraceae	*Oenothera pallida ssp. pallida*	N
Pinaceae	*Pinus edulis*	N
Plantaginaceae	*Plantago patagonica*	N
Poaceae	*Achnatherum hymenoides*	N
Poaceae	*Agrostis exarata*	N
Poaceae	*Andropogon gerardii*	N
Poaceae	*Andropogon hallii*	N
Poaceae	*Aristida purpurea*	N
Poaceae	*Aristida purpurea var. fendleriana*	N
Poaceae	*Bouteloua barbata*	N
Poaceae	*Bouteloua curtipendula*	N

Family Name	Latin Name	Status
Poaceae	*Bouteloua gracilis*	N
Poaceae	*Bromus rubens*	I
Poaceae	*Bromus tectorum*	I, SWEMP
Poaceae	*Elymus elymoides ssp. elymoides*	N
Poaceae	*Eragrostis pectinacea*	N
Poaceae	*Hesperostipa neomexicana*	N
Poaceae	*Hordeum murinum ssp. glaucum*	I
Poaceae	*Lycurus phleoides*	N
Poaceae	*Monroa squarrosa*	N
Poaceae	*Muhlenbergia curtifolia*	N
Poaceae	*Muhlenbergia thurberi*	N
Poaceae	*Poa fendleriana*	N
Poaceae	*Poa fendleriana ssp. longiligula*	N
Poaceae	*Polypogon interruptus*	I
Poaceae	*Polypogon monspeliensis*	I
Poaceae	*Sporobolus airoides*	N
Poaceae	*Sporobolus cryptandrus*	N
Poaceae	*Vulpia octoflora*	N
Polemoniaceae	*Gilia leptomeria*	N
Polemoniaceae	*Ipomopsis aggregata*	N
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	N
Polemoniaceae	*Ipomopsis longiflora ssp. longiflora*	N
Polygonaceae	*Eriogonum corymbosum*	N
Polygonaceae	*Eriogonum umbellatum*	N
Portulacaceae	*Portulaca halimoides*	N
Portulacaceae	*Portulaca oleracea*	N, SWEMP
Portulacaceae	*Talinum brevifolium*	N
Portulacaceae	*Talinum confertiflorus*	N
Pteridaceae	*Adiantum capillus-veneris*	N
Ranunculaceae	*Clematis ligusticifolia*	N
Ranunculaceae	*Ranunculus cymbalaria*	N
Rosaceae	*Cercocarpus intricatus*	N
Rosaceae	*Fallugia paradoxa*	N
Rosaceae	*Purshia stansburiana*	N
Salicaceae	*Populus angustifolia*	N
Salicaceae	*Populus fremontii*	N
Salicaceae	*Salix exigua*	N
Salicaceae	*Salix gooddingii*	N
Scrophulariaceae	*Castilleja linariifolia*	N
Solanaceae	*Chamaesaracha coronopus*	N
Solanaceae	*Datura wrightii*	N
Solanaceae	*Lycium pallidum*	N
Solanaceae	*Nicotiana attenuata*	N
Solanaceae	*Physalis hederifolia var. fendleri*	N
Sparganiaceae	*Sparganium eurycarpum*	N

Family Name	Latin Name	Status
Tamaricaceae	*Tamarix ramosissima*	I, SWEMP
Ulmaceae	*Celtis laevigata var. reticulata*	N
Urticaceae	*Parietaria pensylvanica*	N
Zygophyllaceae	*Tribulus terrestris*	I, SWEMP

Appendix 2C. Keet Seel unit vascular plant species list. N= Native, I = Introduced, C = Cultivated, SWEMP = Southwest Exotic Plant Mapping Program

Family Name	Latin Name	Status
Aceraceae	*Acer negundo*	N
Agavaceae	*Yucca angustissima*	N
Amaranthaceae	*Amaranthus hypochondriacus*	I
Amaranthaceae	*Amaranthus retroflexus*	I
Anacardiaceae	*Rhus trilobata*	N
Asclepiadaceae	*Funastrum heterophyllum*	N
Asteraceae	*Achillea millefolium*	N/I
Asteraceae	*Ambrosia acanthicarpa*	N
Asteraceae	*Ambrosia artemisiifolia*	N
Asteraceae	*Artemisia dracunculus*	N
Asteraceae	*Artemisia frigida*	N
Asteraceae	*Artemisia ludoviciana*	N
Asteraceae	*Artemisia nova*	N
Asteraceae	*Artemisia tridentata*	N
Asteraceae	*Brickellia californica*	N
Asteraceae	*Brickellia grandiflora*	N
Asteraceae	*Brickellia microphylla var. scabra*	N
Asteraceae	*Chaenactis stevioides*	N
Asteraceae	*Chrysothamnus pulchellus*	N
Asteraceae	*Chrysothamnus viscidiflorus*	N
Asteraceae	*Cirsium calcareum*	N
Asteraceae	*Cirsium vulgare*	I, SWEMP
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	N
Asteraceae	*Erigeron concinnus*	N
Asteraceae	*Erigeron divergens*	N
Asteraceae	*Gutierrezia sarothrae*	N
Asteraceae	*Heterotheca villosa*	N
Asteraceae	*Hymenopappus filifolius*	N
Asteraceae	*Lactuca tatarica var. pulchella*	N
Asteraceae	*Machaeranthera canescens var. glabra*	N
Asteraceae	*Machaeranthera grindelioides*	N
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	N
Asteraceae	*Packera multilobata*	N
Asteraceae	*Tetradymia canescens*	N
Asteraceae	*Xanthium strumarium*	N, SWEMP
Berberidaceae	*Mahonia repens*	N
Boraginaceae	*Cryptantha flava*	N
Boraginaceae	*Lappula occidentalis var. occidentalis*	N
Brassicaceae	*Arabis perennans*	N
Brassicaceae	*Capsella bursa-pastoris*	I
Brassicaceae	*Chorispora tenella*	I, SWEMP

Family Name	Latin Name	Status
Brassicaceae	*Descurainia pinnata*	N
Brassicaceae	*Descurainia sophia*	I, SWEMP
Brassicaceae	*Erysimum capitatum var. capitatum*	N
Brassicaceae	*Lepidium montanum*	N
Brassicaceae	*Lesquerella intermedia*	N
Brassicaceae	*Sisymbrium altissimum*	I
Brassicaceae	*Streptanthella longirostris*	N
Brassicaceae	*Thelypodium integrifolium*	N
Cactaceae	*Echinocereus fendleri*	N
Cactaceae	*Escobaria vivipara var. vivipara*	N
Cactaceae	*Opuntia erinacea*	N
Cactaceae	*Opuntia phaeacantha*	N
Cactaceae	*Opuntia polyacantha*	N
Cactaceae	*Sclerocactus whipplei*	N
Capparaceae	*Cleome serrulata*	N
Caryophyllaceae	*Arenaria eastwoodiae*	N
Chenopodiaceae	*Atriplex canescens*	N
Chenopodiaceae	*Chenopodium album*	N
Chenopodiaceae	*Chenopodium desiccatum*	N
Chenopodiaceae	*Chenopodium fremontii*	N
Chenopodiaceae	*Chenopodium glaucum*	I
Chenopodiaceae	*Chenopodium leptophyllum*	N
Chenopodiaceae	*Chenopodium pratericola*	N
Chenopodiaceae	*Salsola tragus*	I, SWEMP
Commelinaceae	*Tradescantia occidentalis*	N
Cupressaceae	*Juniperus osteosperma*	N
Elaeagnaceae	*Shepherdia rotundifolia*	N
Ephedraceae	*Ephedra viridis*	N
Euphorbiaceae	*Chamaesyce glyptosperma*	N
Fabaceae	*Astragalus lentiginosus*	N
Fabaceae	*Astragalus zionis*	N
Fagaceae	*Quercus gambelii*	N
Geraniaceae	*Erodium cicutarium*	I, SWEMP
Grossulariaceae	*Ribes cereum*	N
Grossulariaceae	*Ribes leptanthum*	N
Grossulariaceae	*Ribes viscosissimum*	N
Hydrangeaceae	*Fendlera rupicola*	N
Hydrophyllaceae	*Phacelia ivesiana*	N
Juglandaceae	*Juglans major*	N
Juncaceae	*Juncus balticus*	N
Liliaceae	*Maianthemum stellatum*	N
Malvaceae	*Sphaeralcea coccinea*	N
Malvaceae	*Sphaeralcea parvifolia*	N
Nyctaginaceae	*Abronia elliptica*	N
Nyctaginaceae	*Mirabilis comata*	N

Family Name	Latin Name	Status
Nyctaginaceae	*Mirabilis oxybaphoides*	N
Onagraceae	*Epilobium hornemannii*	N
Onagraceae	*Oenothera caespitosa*	N
Pinaceae	*Pinus edulis*	N
Pinaceae	*Pseudotsuga menziesii*	N
Poaceae	*Achnatherum hymenoides*	N
Poaceae	*Alopecurus aequalis*	N
Poaceae	*Bromus carinatus*	N
Poaceae	*Bromus rubens*	I
Poaceae	*Bromus tectorum*	I, SWEMP
Poaceae	*Elymus caninus*	I
Poaceae	*Elymus elymoides ssp. elymoides*	N
Poaceae	*Hesperostipa comata ssp. comata*	N
Poaceae	*Hordeum murinum ssp. leporinum*	I
Poaceae	*Monroa squarrosa*	N
Poaceae	*Muhlenbergia andina*	N
Poaceae	*Poa fendleriana*	N
Poaceae	*Poa fendleriana ssp. longiligula*	N
Poaceae	*Poa pratensis*	N/I
Poaceae	*Polypogon monspeliensis*	I
Poaceae	*Polypogon viridis*	I
Poaceae	*Puccinellia nuttalliana*	N
Poaceae	*Sporobolus airoides*	N
Poaceae	*Sporobolus cryptandrus*	N
Poaceae	*Sporobolus flexuosus*	N
Poaceae	*Vulpia octoflora*	N
Polemoniaceae	*Gilia leptomeria*	N
Polemoniaceae	*Ipomopsis aggregata ssp. aggregata*	N
Polemoniaceae	*Leptodactylon pungens*	N
Polemoniaceae	*Phlox longifolia*	N
Polygonaceae	*Eriogonum microthecum*	N
Portulacaceae	*Portulaca oleracea*	N, SWEMP
Ranunculaceae	*Clematis ligusticifolia*	N
Rosaceae	*Cercocarpus intricatus*	N
Rosaceae	*Prunus emarginata*	N
Rosaceae	*Prunus munsoniana*	I
Rosaceae	*Purshia tridentata*	N
Rubiaceae	*Galium aparine*	N
Rubiaceae	*Kelloggia galioides*	N
Salicaceae	*Salix exigua*	N
Salicaceae	*Salix gooddingii*	N
Salicaceae	*Salix lucida ssp. lasiandra*	N
Santalaceae	*Comandra umbellata ssp. pallida*	N
Scrophulariaceae	*Castilleja linariifolia*	N
Scrophulariaceae	*Mimulus eastwoodiae*	N

Family Name	Latin Name	Status
Scrophulariaceae	*Penstemon rostriflorus*	N
Solanaceae	*Datura wrightii*	N
Solanaceae	*Physalis hederifolia*	N
Solanaceae	*Solanum jamesii*	N

Appendix 3. Navajo Endangered Species List

NAVAJO NATION
DIVISION OF NATURAL RESOURCES
DEPARTMENT OF FISH AND WILDLIFE

NAVAJO ENDANGERED SPECIES LIST
Resources Committee Resolution No.
RCMA-31-01
March 2001

GROUP 1: Those species or subspecies that no longer occur on the Navajo Nation.

GROUP 2 (G2) & GROUP 3 (G3): "Endangered" -- Any species or subspecies whose prospects of survival or recruitment within the Navajo Nation are in jeopardy or are likely within the foreseeable future to become so.

G2: A species or subspecies whose prospects of survival or recruitment are in jeopardy.

G3: A species or subspecies whose prospects of survival or recruitment are likely to be in jeopardy in the foreseeable future.

GROUP 4: Any species or subspecies for which the Navajo Nation Department of Fish and Wildlife (NNDFWL) does not currently have sufficient information to support their being listed in G2 or G3 but has reason to consider them. The NNDFWL will actively seek information on these species to determine if they warrant inclusion in a different group or removal from the list.

The NNDFWL shall determine the appropriate group for listing a species or subspecies due to any of the following factors:

1. The present or threatened destruction, modification, or curtailment of its habitat;
2. Over-utilization for commercial, sporting or scientific purposes;
3. The effect of disease or predation;
4. Other natural or man-made factors affecting its prospects of survival or recruitment within the Navajo Nation; or
5. Any combinations of the forgoing factors

NAVAJO ENDANGERED SPECIES LIST – March 2001

Scientific name (Common name)

GROUP 1:

MAMMALS

Canis lupus (Gray Wolf)
Lontra canadensis (Northern River Otter)
Ursus arctos (Grizzly or Brown Bear)

BIRDS

Centrocercus minimus (Gunnison Sage-Grouse)

FISHES

Gila elegans (Bonytail)

GROUP 2:

MAMMALS

Mustela nigripes (Black-footed Ferret)

BIRDS

Empidonax traillii extimus (Southwestern Willow Flycatcher)

AMPHIBIANS

Rana pipiens (Northern Leopard Frog)

FISHES

Gila cypha (Humpback Chub)
Gila robusta (Roundtail Chub)
Ptychocheilus lucius (Colorado Pikeminnow)
Xyrauchen texanus (Razorback Sucker)

PLANTS

Astragalus humillimus (Mancos Milk-vetch)
Erigeron rhizomatus (Rhizome Fleabane)
Pediocactus bradyi (Brady Pincushion Cactus)

GROUP 3:

MAMMALS

Antilocapra americana (Pronghorn)*
Ovis canadensis (Bighorn Sheep)

BIRDS

Aquila chrysaetos (Golden Eagle)
Buteo regalis (Ferruginous Hawk)
Cinclus mexicanus (American Dipper)
Coccyzus americanus (Yellow-billed Cuckoo)
Strix occidentalis lucida (Mexican Spotted Owl)

INVERTEBRATES

Speyeria nokomis (Western Seep Fritillary)

NAVAJO ENDANGERED SPECIES LIST – March 2001

Scientific name (Common name)

PLANTS

Allium gooddingii (Gooding's Onion)
Astragulus cremnophylax var. *hevroni* (Marble Canyon Milk-vetch)
Astragalus cutleri (Cutler's Milk-vetch)
Carex specuicola (Navajo Sedge)
Erigeron acomanus (Acoma Fleabane)
Pediocactus peeblesianus var. *fickeiseniae* (Fickeisen Plains Cactus)
Penstemon navajoa (Navajo Penstemon)
Platanthera zothecina (Alcove Bog-orchid)
Sclerocactus mesae-verdae (Mesa Verde Cactus)

*G3 designation **excludes** NNDFWL Management Unit 16 ('New Lands'), the boundaries of which are: From Sanders, AZ east along Unit 4 boundary to the Zuni boundary; south along the boundary past AZ Hwy 61 to the Navajo Nation/state boundary; west along the boundary past US Hwy 666 to the Navajo Nation/state boundary; north along Rd 2007 to Navajo, AZ; west (to the north and south of Interstate 40) to the state/Petrified Forest National Park boundary; north along the boundary to the Unit 8 boundary; east along the boundary to US Hwy 191; south to Chambers and east to Sanders. For a Unit 16 map, contact NNDFWL, P.O. Box 1480, Window Rock, AZ, 86515, (520) 871-6451.

GROUP 4:

MAMMALS

Dipodomys microps (Chisel-toothed Kangaroo Rat)
Microtus mexicanus (= mogollonensis) (Navajo Mountain Vole)
Plecotus townsendii (Townsend's Big-eared Bat)
Vulpes macrotis (Kit Fox)

BIRDS

Accipiter gentilis (Northern Goshawk)
Aechmophorus clarkii (Clark's Grebe)
Aegolius acadicus (Northern Saw-whet Owl)
Ceryle alcyon (Belted Kingfisher)
Charadrius montanus (Mountain Plover)
Columba fasciata (Band-tailed Pigeon)
Dendragapus obscurus (Blue Grouse)
Dendroica petechia (Yellow Warbler)
Empidonax hammondii (Hammond's Flycatcher)
Falco peregrinus (Peregrine Falcon)
Glaucidium gnoma (Northern Pygmy-Owl)
Otus flammeolus (Flammulated Owl)
Picoides tridactylus (Three-toed Woodpecker)
Porzana carolina (Sora)
Tachycineta bicolor (Tree Swallow)

REPTILES

Lampropeltis triangulum (Milk Snake)
Sauromalus ater (Chuckwalla)

FISHES

Catostomus discobolus (Bluehead Sucker)
Cottus bairdi (Mottled Sculpin)

INVERTEBRATES

Oxyloma kanabense (Kanab Ambersnail)

PLANTS

Amsonia peeblesii (Peebles Blue-star)
Asclepias sanjuanensis (San Juan Milkweed)
Asclepias welshii (Welsh's Milkweed)
Astragalus cronquistii (Cronquist Milk-vetch)
Astragalus naturitensis (Naturita Milk-vetch)
Astragalus sophoroides (Painted Desert Milk-vetch)
Astragalus tortipes (Sleeping Ute Milk-vetch)
Camissonia atwoodii (Atwood's Camissonia)
Clematis hirsutissima var. *arizonica* (Arizona Leather Flower)
Cryptantha atwoodii (Atwood's Catseye)
Cymopterus acaulis var. *higginsii* (Higgins Biscuitroot)
Cystopteris utahensis (Utah Bladder-fern)
Erigeron sivinskii (Sivinski's Fleabane)
Errazurizia rotundata (Round Dunebroom)
Lesquerella navajoensis (Navajo Bladderpod)
Perityle specuicola (Alcove Rock Daisy)
Phacelia indecora (Bluff Phacelia)
Phacelia welshii (Welsh Phacelia)
Puccinella parishii (Parish's Alkali Grass)

Appendix 4. Navajo Natural Heritage Program Element Tracking List – Plants. July 2001.

Scientic Name	Common Name
Agave utahensis var. kaibabensis	Utah Century Plant
Aletes macdougalii	Macdougal's Aletes
Aletes sessiliflorus	Sessile-Flower Aletes
Amsonia tomentosa var. stenophylla	Narrowleaf Blue Star
Angelica pinnata	Small-Leaf Angelica
Aquilegia desertorum	Desert Columbine
Artemisia pygmaea	Pigmy Sagebrush
Asclepias cutleri	Cutler Milkweed
Astragalus accumbens	Zuni Milk-vetch
Astragalus beathii	Beath Milk-vetch
Astragalus chuskanus	Chuska Milk-vetch
Astragalus cremnophylax var. myriorrhaphis	Sentry Milk-vetch
Astragalus knightii	Knight Milk-vetch
Astragalus micromerius	Chaco Milk-vetch
Astragalus monumentalis var. cottamii	Cottam Milk-vetch
Astragalus monumentalis var. monumentalis	A Milk-vetch
Astragalus xiphoides	Gladiator Milk-vetch
Besseya arizonica	Arizona Coral-Drops
Calypso bulbosa	Fairy Slipper
Camissonia specuicola ssp. specuicola	
Chrysothamnus molestus	Disturbed Rabbitbrush
Cirsium rydbergii	Rydberg's Thistle
Cymopterus megacephalus	Bighead Spring-Parsley
Cypripedium parviflorum	Yellow Lady's Slipper
Dalea scariosa	A Prairie-Clover
Dalea scoparia	Broom Pea
Eremocrinum albomarginatum	Sand Lily
Erigeron bistiensis	Bisti Fleabane
Erigonum clavellatum	Comb Wash Wild Buckwheat
Eriogonum heermannii var. subracemosum	A wild buckwheat
Eriogonum ripleyi	Ripley's Wild Buckwheat
Euphorbia aaron-rossii	
Gilia formosa	Aztec Gilia
Hesperodoria salicinus	A Goldenweed
Hesperodoria scopulorum	Grand Canyon Glowweed
Hedeoma diffusum	Flagstaff Pennyroyal
Hymenoxys helenioides	Intermountain Bitterweed
Isoetes bolanderi	Bolander Quillwort
Mammillaria wrightii var. wrightii	Wright Fishhook Cactus

Scientic Name	Common Name
Oenothera cavernae	Cave Evening-Primrose
Ostrya knowltonii	Knowlton Hop-Hornbeam
Parthenium alpinum var. alpinum	Alpine fever-few
Pediocactus paradinei	Park Pincushion-Cactus
Pediocactus peeblesianus var. peeblesianus	Peebles Navajo Cactus
Phacelia howelliana	Howell Phacelia
Phacelia mammillarensis	Nipple Phacelia
Phacelia splendens	Splendid Scorpion Weed
Phlox cluteana	Navajo Mountain Phlox
Platanthera stricta	Slender Bog-orchid
Polygala acanthoclada	Thorn Milkwort
Primula specuicola	Cave Primrose
Proatriplex pleiantha	Mancos Saltbrush
Psoralidium junceum	Western Scurf Pea
Psorothamnus arborescens var. pubescens	Marble Canyon Dalea
Psorothamnus thompsoniae var. whitingii	Whiting Indigo Bush
Rosa stellata ssp abyssa	Grand Canyon Rose
Salvia pachyphylla	Hopi Sage
Sclerocactus cloveriae ssp. brackii	Brack's Cactus
Tetradymia filifolia	Thread-Leaf Horsebrush
Toumeya papyracantha	Grama Grass Cactus
Zigadenus vaginatus	Alcove Death Camass