Final Project Report

Agency/Organization: Board of Regents of the Nevada System of Higher Education, on Behalf of the College of Southern Nevada

Project Name: Relocation of the Wesley E. Niles Herbarium

Project Number: CSN-2387A

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Executive Summary

The Wesley E. Niles Herbarium and its associated taxonomic literature focus on the native and naturalized flora of the Great Basin and Mojave Deserts. The Wesley E. Niles collection constitutes an invaluable, and irreplaceable warehouse of biological, geographical, and historical data.

Prior to this project, the collection could only be utilized via in-person visits to the herbarium. The Clark County Desert Conservation Program contracted with Board of Regents of the Nevada System of Higher Education on behalf of the College of Southern Nevada to enter label data, georeference, and digitally scan specimens representing plant taxa of conservation concern. Specific goals were to:

1. Georeference and digitize all specimens of vascular plant taxa on the Nevada Division of Natural Heritage (NDNH) Watch List and on the Clark County Multiple Species Habitat Management Plan (MSHCP).
2. Upload georeferenced coordinates, digital images, and label data for all specimens to Symbiota, an open-source relational database that can be searched by anyone.

As of October 1, 2025, the project is complete. Nine thousand, six hundred, sixty (9,660) herbarium specimens have been georeferenced and digitized. Georeferenced coordinates, digital images, and label data for all specimens have been uploaded to Symbiota, and can be viewed by individuals throughout the world. The 9,660 specimens have been fully databased include 2046 specimens of taxa on the NDNH Track List, NDNH Watch List, MSHCP Proposed Covered Species, and MSHCP Covered Species.

Introduction

Description of the Project

The Wesley E. Niles Herbarium was transferred to the College of Southern Nevada (CSN) from the University of Nevada Las Vegas (UNLV) in fall 2023. The collection consists of more than 65,000 accessioned specimens. It is unique in its focus on the flora of the Mojave Desert and adjacent regions.

Upon transfer, CSN committed itself to improving the quality of the collection and to improving access for users, particularly individuals working for County, State, and Federal Land Management Agencies. The most effective means of improving access is to georeference specimens, digitize them, and then upload georeferenced coordinates, digital images, and label data to Symbiota. Symbiota is an open-

source relational database for biodiversity data. Data recorded in Symbiota can be accessed by individuals worldwide via online Portals. A portal is a collaborative community of collections that has a regional scope. The Wesley E. Niles Herbarium is part of the Intermountain Region Herbarium Network (IRHN). The IRHN Portal (IRHN) is the appropriate one for accessing Wesley E. Niles specimens.

Background and Need for the Project

In the short-term, the most critical specimens to digitize, georeference, and upload label data for are specimens documenting the occurrence of Threatened and Endangered Species or species of conservation concern.

The process of uploading georeferenced coordinates, digital images, and label data for a specimen is hereafter referred to as "databasing." Within Symbiota, all data entered for a specimen constitutes a "record." A "complete record" is one that has georeferenced coordinates, a digital image, and label data.

Georeferencing is the process of interpreting the written description of where a specimen was collected and verifying associated geographic coordinates or assigning new coordinates (Rowe, 2005). Georeferenced coordinates allow the location of a specimen to be determined with a specific degree of certainty. For example, if the georeferenced coordinates of a specimen are N34.874022, W-111.75774, +/- 500, we know, with certainty that the actual location of the specimen lies within a circle of 500m radius centered at N34.874022, W-111.75774.

Quality digital images of specimens allow measurements to be taken and fine morphological details to be observed. Consequently, they are important for validating taxon identification and for assessing morphological variation within a prescribed area.

Herbarium specimens with complete records can be used to construct Species Distribution Models (SDM). SDM (also referred to as Bioclimatic Envelope Models) as are the most widely used approach to forecast the effects of climate change on the persistence of taxa (Weins et al. 2009, Hijmans and Graham 2006, Elith et al. 2010).

Due to the importance of accessible, complete records, the Clark County Desert Conservation Program (County) contracted the Board of Regents of the Nevada System of Higher Education on behalf of CSN (Agency) to database all specimens that can assist research on plant taxa of concern within Clark County.

Goals and Objectives of the Project

The primary goal of the project was to database all accessioned specimens documenting taxa on the Nevada Division of Natural Heritage (NDNH) Watch List and the Clark County Multiple Species Habitat Conservation Plan (MSCHP). A secondary goal was to digitize, georeference, and enter label data for all accessioned specimens documenting taxa on the NDNH Track List and MSHCP Proposed Covered Species.

Methods and Materials

All accessioned specimens documenting vascular plant taxa on the NDNH Watch List, MSCHP, NDNH Track List, and MSHCP Proposed Covered Species were located and moved to an empty herbarium

cabinet. All specimens were then checked against current taxonomy and nomenclature based on the International Plant Names Index (https://www.ipni.org/). If discrepancies were found, specimens were formally annotated as to the most current nomenclature. If the identification of a specimen was uncertain, experts in the relevant taxonomic group were consulted to make an accurate identification.

For each specimen, label information was entered into Symbiota using a set of standardized fields. These fields are aligned to the Darwin Core data exchange standard (Darwin Core 2009) that facilitates sharing of information about biological diversity by providing identifiers, labels, and definitions.

The specimen was then georeferenced by the Wesley E, Niles Collections manager, Dr. Marcus Hooker.

Specimens were digitally scanned using digitization station constructed from the following materials:

- 1 Nikon D780 camera
- 1 50mm lens
- 1 Camera power adapter
- 1 Color separator
- 1 Copy stand
- 2 Softbox photography lights
- 1 HDMI cable
- 1 2TB external hard drive.

Image files will be named using a standardized format that includes the name of the taxon, the herbarium accession number (a unique number assigned to a specimen of a taxon collected by a specific person in a specific place on a specific date), and the name of the collector. For example, the file name "Astragalus callithrix_52468_Tiehm.jpg" indicates a JPEG image of accession number 52468. This accession number is assigned to a specimen of Astragalus callithrix collected by Arnold Tiehm on May 5, 2001 in the Stewart Valley of Mineral County.

Image files are permanently stored as JPEG and camera-specific formats (e.g., Nikon raw format) on the hard drive of a dedicated imaging computer. All images are backed up on two external hard drives stored in different locations.

Once all the data necessary for a complete record were obtained, they were uploaded to Symbiota by Dr. Hooker and student workers under his direct supervision.

Results and Evidence of Results

Complete records for all 9660 specimens that were databased are publicly available. To locate records, go to the Intermountain Region Herbarium Network web portal: IRHN. Once on the portal webpage follow the steps below:

1. Mouse over the Search+ heading at the top of the page
2. Choose Classic Search
3. Deselect "All Collections"
4. Check College of Southern Nevada; Wesley E. Niles Herbarium (UNLV)

5. Click the Search button in the upper right-hand corner
6. On the Search page, type the scientific name of the Taxon
7. Click the List Display button in the upper right-hand corner

All records for the Taxon will appear. For example, selecting *Arctomecon californica* will yield 36 records.

To obtain the complete record for a specimen, click "Full Record Details." A complete record will include all data recorded on the specimen label, georeferenced coordinates, a map showing the location of the specimen, and other important information such as whether the specimen is a voucher specimen for a specific scientific study. It will also include links to open the digital image as a medium or large JPEG file.

An example of a full record for *Arctomecon californica*, including label information, a map of the georeferenced coordinates, and a digital image is provided in Appendix 1. Appendix 2 provides a tabular summary of complete records for all taxa on the NDNH track List, NDNH Watch List, MSHCP Proposed Covered Species list, and MSHCP. Taxa not found in Appendix 2, have no specimens deposited in the Wesley E. Niles Herbarium.

Evaluation/Discussion of Results

Our digital images are high quality and comparable to those of much larger herbaria such the New York Botanical Garden and the Kew Herbarium.

Complete records in Symbiota extend access to the Wesley E. Niles collection worldwide. This increased access dramatically increases the utility and value of the collection.

As noted in the introduction, quality full specimen records can be used in construction of SDM that allow County, State and Federal Agencies to forecast the effects of anthropogenic change on the persistence of taxa (Weins et al. 2009, Hijmans and Graham 2006, Elith et al. 2010).

Conclusion

This project is only the beginning of CSN's efforts to database specimens. The long-term goal is to database every specimen in the Wesley E. Niles collection. Money paid to the Agency by the County allowed the purchase of materials for, and construction of, the digitization station.

The station is relatively easy to maintain. Consequently, we will continue digitizing specimens in a systematic fashion. If the County has specific taxa (now or in the future) they want to be databased, they can make a request, and we will give those taxa priority for databasing.

Recommendations

We have no specific recommendations.

Literature Cited

Darwin Core Task Group. 2009. Darwin Core. Biodiversity Information Standards (TDWG) http://www.tdwg.org/standards/450

Elith, J., M. Kearny, and S. Philips. 2010. The art of modeling range shifting species. Methods in Ecology and Evolution 1: 330-342.

Hijmans, R. J. and C. H. Graham. 2006. The ability of climate envelope models to predict the effect of climate change on species distributions. Global Change Biology 12: 2272-2281.

Rowe, R. J. 2005. Elevational gradient analysis and the use of historical museum specimens: A cautionary tale. Journal of Biogeography 32: 1883-1897.

Weins, J. A., D. Stalberg, D. Jongsmjit, C. A. Howell and M. A. Snyder. 2009. Niches, models, and climate change: assessing the assumptions and uncertainties. Proceedings of the National Academy of Sciences of the United States of America 106: 19729-19736.

Appendix 1 – A full record for a specimen of *Arctomecon californica*, including a map based on the georeferenced coordinates (N36.174045, W-114.91414 +/- 500m, WGS84), and the digital image.

Intermountain Herbaria Portal - Occurrence Profile - Personal - Microsoft Edge

https://intermountainbiota.org/portal/collections/individual/index.php?occid=23914021&clid=0

Details | Map | Comments | Linked Resources

College of Southern Nevada; Wesley E. Niles Herbarium (UNLV)

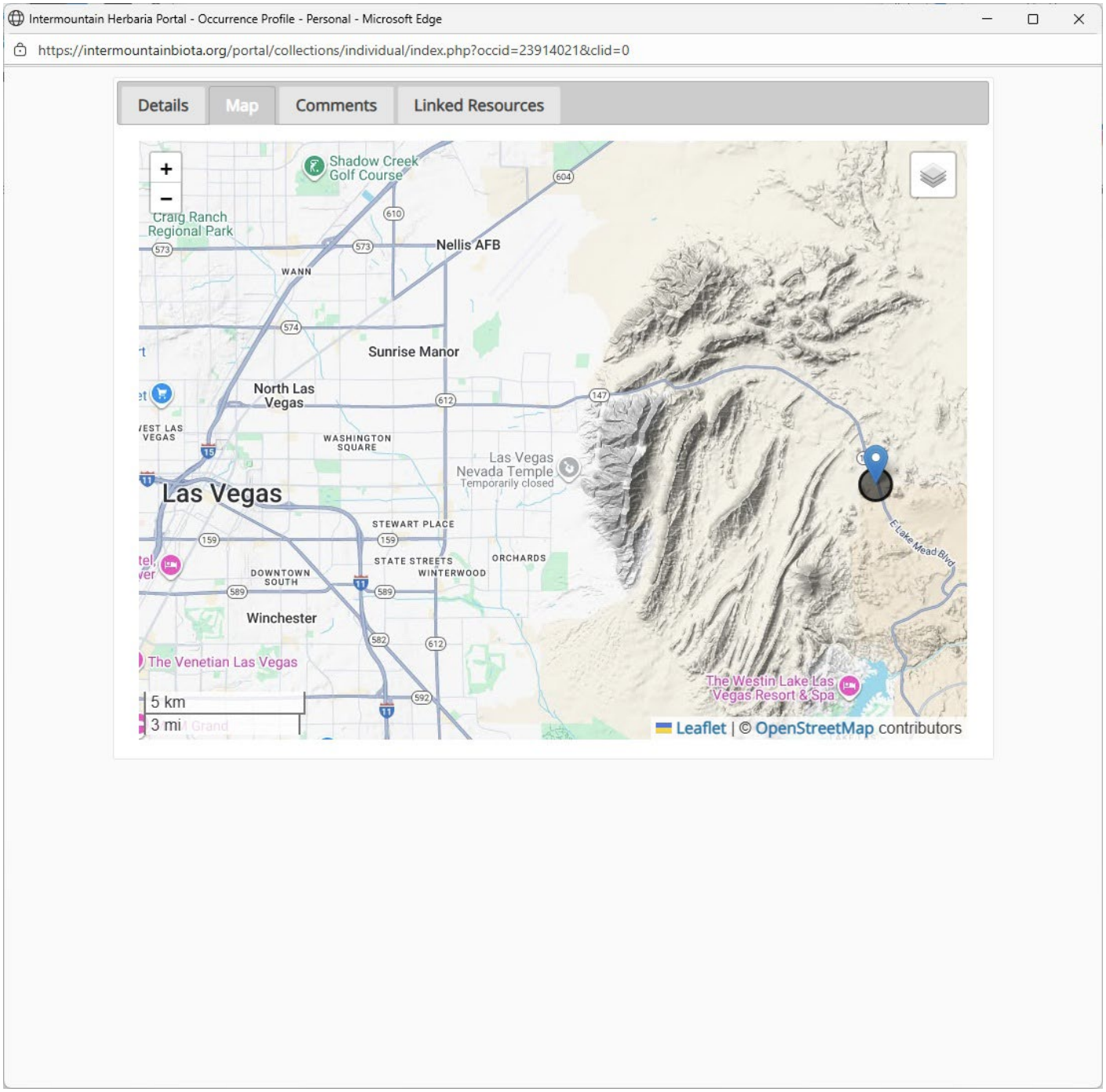
Catalog #: 12102
Occurrence ID: 92d38e82-fdf2-4505-8183-ab7f169aacc1
Taxon: *Arctomecon californica* Torr. & Frém.
Family: Papaveraceae
Collector: P.J. Leary
Number: 1506
Date: 1977-03-24
Verbatim Date: 24 March 1977
Locality: United States, Nevada, Clark, E of Frenchman Mtn, near entrance to Lake Mead National Recreation Area
Latitude/Longitude: 36.174045 -114.91414 +-500m. WGS84
Elevation: 488 meters **Verbatim Elevation:** 1600 ft.
Habitat: Atriplex hymenelytra, Enceliopsis argophylla, Petalonyx parryi

Specimen Media

Open Medium File
Open Large File

http://creativecommons.org/publicdomain/zero/1.0/
Rights Holder: College of Southern Nevada
For additional information about this specimen, please contact: Marcus Hooker, Collection Manager (marcus.hooker@csn.edu)

Appendix 1 – continued.



Appendix 1 – continued**.**

Appendix 2 – Table showing the number of specimens digitized and uploaded to Symbiota for all taxa on the NDNH Track List, NDNH Watch List, MSHCP Proposed Covered Species, and MSHCP Covered Species. Taxa are absent from this table currently have no specimens in the Wesley E. Niles Herbarium.

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
Vascular Plants					
Ferns and Clubmosses					
1	*Botrychium ascendens*	X			
1	*Botrychium crenulatum*	X			
1	*Botrychium lunaria subsp. minganense*		X		
1	*Botrychium lunaria var. onondagense*		X		
Gymnosperms					
32	*Ephedra funerea*		X		
17	*Pinus albicaulis*	X			
Dicots					
1	*Agastache cusickii*		X		
10	*Angelica scabrida*	X			
1	*Antennaria arcuata*	X			
9	*Antennaria soliceps*	X			
6	*Anulocaulis leiosolenus var. leiosolenus*	X		X	X
33	*Arctomecon californica*	X		X	X
38	*Arctomecon merriamii*	X			X
1	*Artemisia packardiae*		X		
3	*Artemisia papposa*		X		
8	*Asclepias eastwoodiana*	X			
9	*Astragalus ackermanii*	X			
18	*Astragalus aequalis*	X			X
6	*Astragalus amphioxys var. musimonum*	X			
3	*Astragalus anserinus*	X			
2	*Astragalus austiniae*	X			
22	*Astragalus beatleyae*	X			
2	*Astragalus callithrix*		X		
3	*Astragalus calycosus var. monophyllidius*	X			
1	*Astragalus cimae*	X			
8	*Astragalus convallarius var. finitimus*		X		
2	*Astragalus convallarius var. margaretae*	X			
3	*Astragalus convallarius var. margaretiae*	X			
1	*Astragalus ensiformis var. gracilior*	X			
3	*Astragalus eurylobus*	X			
12	*Astragalus funereus*	X			

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
29	*Astragalus geyeri var. triquetrus*	X		X	X
1	*Astragalus hornii*	X			
1	*Astragalus inyoensis*	X			
2	*Astragalus jejunus*		X		
3	*Astragalus johannis-howellii*	X			
12	*Astragalus lentiginosus var. latus*	X			
19	*Astragalus lentiginosus var. scorpionis*		X		
3	*Astragalus lentiginosus var. sesquimetralis*	X			
26	*Astragalus lentiginosus var. stramineus*	X			
43	*Astragalus mohavensis var. mohavensis*		X		
44	*Astragalus mokiacensis*	X			
26	*Astragalus nyensis*	X			
3	*Astragalus oophorus var. clokeyanus*	X			
10	*Astragalus oophorus var. lavinii*	X			
5	*Astragalus oophorus var. lonchocalyx*	X			
5	*Astragalus phoenix*	X			
12	*Astragalus porrectus*		X		
19	*Astragalus preussii var. laxiflorus*	X			
9	*Astragalus pseudiodanthus*	X			
11	*Astragalus pterocarpus*		X		
3	*Astragalus pulsiferae var. coronensis*	X			
1	*Astragalus pulsiferae var. pulsiferae*	X			
15	*Astragalus remotus*	X			
2	*Astragalus robbinsii var. occidentalis*	X			
2	*Astragalus serenoi var. sordescens*		X		
1	*Astragalus solitarius*	X			
5	*Astragalus tiehmii*	X			
3	*Astragalus toquimanus*	X			
1	*Astragalus uncialis*	X			
1	*Astragalus yoder-williamsii*	X			
1	*Atriplex argentea var. longitrichoma*	X			
5	*Boechera dispar*		X		
1	*Boechera falcifructa*	X			
6	*Boechera nevadensis*	X			
1	*Boechera pinzliae*	X			
33	*Boechera shockleyi*		X		
15	*Camissonia megalantha*	X			
30	*Castilleja martini var. clokeyi*		X		X
1	*Castilleja salsuginosa*	X			
6	*Caulanthus barnebyi*	X			
3	*Centaurium namophilum*	X			

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
3	*Chrysothamnus eremobius*	X			
11	*Cirsium arizonicum var. tenuisectum*	X			
4	*Cirsium eatonii var. clokeyi*	X			X
2	*Cirsium eatonii var. viperinum*	X			
29	*Cirsium mohavense*		X		
1	*Cirsium tenuisectum*	X			
6	*Cirsium virginense*	X			
6	*Cordylanthus tecopensis*	X			
2	*Cryptantha clokeyi*	X			
2	*Cryptantha compacta*	X			
3	*Cryptantha schoolcraftii*	X			
22	*Cryptantha tumulosa*		X		
16	*Cryptantha welshii*		X		
2	*Cusickiella quadricostata*	X			
13	*Cylindropuntia multigeniculata*	X		X	X
1	*Cymopterus basalticus*	X			
5	*Cymopterus cinerarius*	X			
2	*Cymopterus goodrichii*	X			
8	*Cymopterus nivalis*		X		
6	*Cymopterus ripleyi var. ripleyi*		X		
9	*Cymopterus ripleyi var. saniculoides*	X			
3	*Draba asterophora*	X			
5	*Draba brachystylis*	X			
12	*Draba jaegeri*	X			
6	*Draba paucifructa*	X			
1	*Draba pedicellata*		X		
5	*Draba pedicellata var. pedicellata*		X		
5	*Draba pedicellata var. wheelerensis*	X			
6	*Draba pennellii*	X			
12	*Draba sphaeroides*		X		
4	*Dudleya pulverulenta subsp. arizonica*		X		
23	*Enceliopsis argophylla*	X		X	
5	*Enceliopsis nudicaulis var. corrugata*	X			
9	*Epilobium canum subsp. garrettii*		X		
10	*Epilobium nevadense*	X			
9	*Eremogone congesta var. charlestonensis*	X			
3	*Eremogone congesta var. simulans*	X			
8	*Eremogone stenomeres*	X			
3	*Ericameria cervina*	X			
12	*Ericameria compacta*	X			
25	*Ericameria watsonii*		X		

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
2	*Erigeron cavernensis*	X			
3	*Erigeron clokeyi var. clokeyi*	X			
3	*Erigeron latus*	X			
2	*Erigeron multiceps*	X			
10	*Erigeron ovinus*	X			
1	*Erigeron uncialis var. uncialis*	X			
12	*Erigeron uncialis var. conjugans*		X		X
8	*Eriogonum alexanderae*	X			
2	*Eriogonum ampullaceum*	X			
11	*Eriogonum anemophilum*	X			
1	*Eriogonum argophyllum*	X			
9	*Eriogonum bifurcatum*	X		X	X
12	*Eriogonum concinnum*	X			
5	*Eriogonum contiguum*		X		
4	*Eriogonum corymbosum var. aureum*	X			
4	*Eriogonum corymbosum var. nilesii*	X			
4	*Eriogonum crosbyae var. crosbyae*	X			
2	*Eriogonum darrovii*		X		
1	*Eriogonum diatomaceum*	X			
1	*Eriogonum douglasii var. elkoense*	X			
1	*Eriogonum eremicum*	X			
9	*Eriogonum esmeraldense var. toiyabense*		X		
16	*Eriogonum heermannii var. clokeyi*	X			
3	*Eriogonum holmgrenii*	X			
7	*Eriogonum lemmonii*	X			
2	*Eriogonum lewisii*	X			
2	*Eriogonum microtheca var. arceuthinum*	X			
1	*Eriogonum microthecum var. schoolcraftii*	X			
1	*Eriogonum nutans var. glabratum*	X			
1	*Eriogonum ovalifolium var. eximium*		X		
1	*Eriogonum ovalifolium var. williamsiae*	X			
5	*Eriogonum pharnaceoides var. cervinum*	X			
1	*Eriogonum prociduum*	X			
22	*Eriogonum rubricaule*		X		
31	*Eriogonum viscidulum*	X			
4	*Eustoma exaltatum*		X		
6	*Ferocactus cylindraceus var. lecontei*		X		
5	*Frasera albomarginata var. induta*	X			
3	*Frasera gypsicola*	X			
6	*Frasera pahutensis*	X			
5	*Galium hilendiae subsp. carneum*		X		

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
4	*Galium hilendiae subsp. kingstonense*	X			
7	*Glossopetalon clokeyi*	X			
15	*Glossopetalon pungens*	X			
3	*Grindelia fraxino-pratensis*	X			
4	*Grusonia pulchella*	X			
2	*Gymnosteris nudicaulis*	X			
2	*Hackelia cusickii*		X		
1	*Hackelia ophiobia*		X		
2	*Helianthus deserticola*	X			
1	*Ivesia aperta*	X			
1	*Ivesia aperta var. aperta*	X			
1	*Ivesia aperta var. canina*	X			
4	*Ivesia arizonica var. saxosa*	X			
13	*Ivesia cryptocaulis*	X			
18	*Ivesia jaegeri*	X			
15	*Ivesia kingii var. kingii*		X		
1	*Ivesia pityocharis*	X			
1	*Ivesia rhypara var. rhypara*	X			
5	*Ivesia webberi*	X			
2	*Jamesia tetrapetala*	X			
2	*Johanneshowellia crateriorum*	X			
8	*Lathyrus hitchcockianus*	X			
3	*Lepidium davisii*	X			
4	*Lepidium integrifolium*	X			
1	*Lepidium montanum var. nevadense*	X			
4	*Lepidium nanum*		X		
12	*Linanthus arenicola*		X		
15	*Lomatium graveolens var. alpinum*		X		
1	*Lomatium roseanum*	X			
5	*Lotus argyraeus subsp. multicaulis*	X			
10	*Lupinus holmgrenanus*	X			
2	*Lupinus holmgrenianus*	X			
6	*Lupinus malacophyllus*		X		
1	*Mentzelia argillicola*	X			
6	*Mentzelia candelariae*	X			
2	*Mentzelia leucophylla*	X			
2	*Mentzelia mollis*	X			
9	*Mentzelia polita*	X			
14	*Mirabilis pudica*		X		
2	*Mirabilis pudica var. pudica*		X		
4	*Nitrophila mohavensis*	X			

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
25	*Oenothera cavernae*	X			
7	*Orobanche californica*	X			
6	*Oryctes nevadensis*	X			
1	*Oxytheca watsonii*		X		
1	*Parthenium ligulatum*		X		
9	*Pedicularis semibarbata subsp. charlestonensis*		X		
3	*Pedicularis semibarbata var. charlestonensis*		X		
8	*Pediomelum castoreum*	X			
10	*Penstemon albomarginatus*	X			
8	*Penstemon arenarius*	X			
15	*Penstemon bicolor subsp. bicolor*	X			
30	*Penstemon bicolor subsp. roseus*	X			
6	*Penstemon calcareus*	X			
3	*Penstemon floribundus*	X			
4	*Penstemon fruticiformis subsp. amargosae*	X			
1	*Penstemon idahoensis*	X			
16	*Penstemon leiophyllus var. francisci-pennellii*	X			
1	*Penstemon leiophyllus var. keckii*	X			
1	*Penstemon moriahensis*	X			
4	*Penstemon palmeri var. macranthus*	X			
2	*Penstemon procerus var. modestus*	X			
3	*Penstemon pudicus*	X			
4	*Penstemon rubicundus*	X			
1	*Penstemon sudans*		X		
13	*Penstemon thompsoniae subsp. jaegeri*	X			X
9	*Perideridia lemmonii*		X		
20	*Perityle intricata*		X		
21	*Phacelia anelsonii*		X		
18	*Phacelia beatleyae*	X			
29	*Phacelia filiae*	X			
3	*Phacelia geraniifolia*	X			
16	*Phacelia glaberrima*		X		
5	*Phacelia hastata var. charlestonensis*		X		
2	*Phacelia inconspicua*	X			
10	*Phacelia inundata*	X			
1	*Phacelia laxiflora*		X		
1	*Phacelia minutissima*	X			
5	*Phacelia monoensis*	X			
20	*Phacelia mustelina*	X			
6	*Phacelia parishii*	X		X	X
13	*Phacelia petrosa*		X		

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
5	*Phlox gladiformis*		X		
10	*Physaria hitchcockii subsp. confluens*	X			
7	*Physaria hitchcockii subsp. hitchcockii*	X			
6	*Physaria pendula*	X			
3	*Plagiobothrys glomeratus*	X			
4	*Plagiobothrys salsus*		X		
2	*Polemonium chartaceum*	X			
4	*Polyctenium williamsiae*	X			
16	*Polygala subspinosa var. heterorhyncha*		X		
3	*Porophyllum pygmaeum*	X			
1	*Potentilla johnstonii*	X			
5	*Primula cusickiana var. nevadensis*	X			
3	*Psorothamnus kingii*	X			
2	*Rorippa subumbellata*	X			
5	*Salvia dorrii var. clokeyi*	X			X
15	*Salvia funerea*	X			
9	*Sclerocactus polyancistrus*	X			
2	*Senecio pattersonensis*	X			
3	*Silene clokeyi*	X			X
2	*Silene nuda*		X		
2	*Sphaeralcea caespitosa*	X			
4	*Sphaeromeria compacta*	X			
6	*Stroganowia tiehmii*	X			
8	*Synthyris ranunculina*	X			
2	*Tonestus eximius*		X		
1	*Tonestus graniticus*	X			
9	*Townsendia jonesii var. tumulosa*	X			
2	*Trifolium andinum var. podocephalum*	X			
1	*Trifolium eriocephalum*	X			
3	*Trifolium leibergii*	X			
14	*Viola charlestonensis*	X			X
21	*Xanthisma grindelioides var. depressum*		X		
Monocots					
6	*Agave utahensis var. eborispina*		X		
3	*Agave utahensis var. nevadensis*		X		
3	*Calochortus leichtlinii*		X		
3	*Calochortus panamintensis*		X		
8	*Calochortus striatus*	X		X	X
12	*Cladium californicum*		X		
6	*Sisyrinchium funereum*	X			
14	*Sisyrinchium radicatum*	X			

Number	Taxon Name	NDNH Track List	NDNH Watch List	MSHCP Proposed Covered Species	MSHCP Covered Species
3	*Spiranthes diluvialis*	X			
1	*Spiranthes infernalis*	X			
6	*Yucca brevifolia var. jaegeriana*			X	