DOE/NV/11718-262

DISTRIBUTION OF CLOKEY'S EGGVETCH (*Astragalus oophorus* var. *clokeyanus*) on THE NEVADA TEST SITE

December 1998

Prepared by

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Prepared for the
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Abstract

The Environment, Safety and Health Division of the U.S. Department of Energy, Nevada Operations Office implements the Ecological Monitoring and Compliance Program on the Nevada Test Site (NTS). This program ensures compliance with applicable environmental laws and regulations, delineates and describes NTS ecosystems, and provides ecological information for predicting and evaluating potential impacts of proposed projects on those ecosystems. Over the last several decades, has taken an active role in providing information on the status of plant species proposed for protection under the Endangered Species Act (ESA). One such species is Clokey's eggvetch (*Astragalus oophorus* var. *clokeyanus*), which is a candidate species under the listing guidelines of the ESA. Surveys for this species were conducted on the NTS in 1996, 1997, and 1998. Field surveys focused on potential habitat for this species in the southern Belted Range and expanded to other areas with similar habitat. Over 30 survey days were completed; five survey days in 1996, 25 survey days in 1997, and three survey days in 1998. Clokey's eggvetch was located at several sites in the southern Belted Range. It was found through much of the northern section of Kawich Canyon, one site at the head of Gritty Gulch, and a rather extensive location in Lambs Canyon. It was also located further south at Captain Jack Springs in the Eleana Range, in much of Falcon Canyon and around Echo Peak on Pahute Mesa, and was also found in the Timber and Shoshone Mountains. Overall, the locations of Clokey's eggvetch on the NTS appears to form a distinct bridge between populations of the species located further north in the Belted and Kawich Ranges and the population located in the Spring Mountains. Clokey's eggvetch was commonly found along washes and small draws, and typically in sandy loam soils with a covering of light tuffaceous rock. It occurs primarily above 1830 meters (6000 feet) in association with single-leaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and big sagebrush (*Artemisia tridentata* ssp. *tridentata*). Overall, the populations of Clokey's eggvetch on the NTS appear to be vigorous and do not appear threatened. It is estimated that there are approximately 2300 plants on the NTS. It should be considered as a species of concern because of its localized distribution, but it does not appear to warrant protection under the ESA.

ACKNOWLEDGEMENTS

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LIST OF ACRYONYMS

BN	Bechtel Nevada, Inc.
cm	Centimeter
DOE/NV	U.S. Department of Energy, Nevada Operations
EG&G/EM	EG&G Energy Measurements, Inc.
ESA	Endangered Species Act
ESHD	Environment, Safety and Health Division
ft	Feet
FWS	Fish and Wildlife Service
GIS	Geographical Information System
m	Meter
mm	Millimeter
NTS	Nevada Test Site
NVNH	Nevada Natural Heritage Program
TNC	The Nature Conservancy
TTR	Tonopah Test Range
UNLV	University of Nevada at Las Vegas
USDI	United States Department of Interior
UTM	Universal Transverse Mercator

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1.0 INTRODUCTION

The U.S. Department of Energy, Nevada Operations Office (DOE/NV) operates the Nevada Test Site (NTS), located approximately 105 km (65 miles) northwest of Las Vegas, Nevada. DOE/NV's Environment, Safety and Health Division (ESHD) provides ecological monitoring and biological compliance support to programs conducted at the NTS. ESHD implements an Ecological Monitoring and Compliance program to (1) ensure compliance with applicable environmental laws and regulations, (2) delineate and define NTS ecosystems, and (3) provide ecological information that can be used to predict and evaluate the potential impacts of proposed projects and programs on those ecosystems.

Over the last several decades, DOE/NV has taken an active role in providing information on the status of plant species proposed for protection under the Endangered Species Act (ESA). In 1975, pursuant to the passage of the ESA in 1973, a list of over 3000 vascular plants were submitted for consideration as threatened or endangered. Thirty-one of those occur or were suspected to occur on the NTS. Between 1977 and 1995, DOE/NV conducted surveys for these 31 species and information on their distribution, habitat and overall ecology was provided to the U.S. Fish and Wildlife Service (FWS) to assist them in determining if a species should be afforded the protection of the ESA (Rhoads and Williams 1977; Rhoads et al. 1978, 1979a, 1979b; Cochrane 1979; Beatley 1977a, 1977b). Based on these early efforts more than half of the species originally proposed to be listed as either threatened or endangered were listed as candidate species; a species being considered by the FWS for listing as endangered or threatened, but not yet the subject of a proposed rule. The species not listed as candidates for listing were removed from any list maintained by the FWS because the plants were found to be extinct, not a valid taxon, more abundant or widespread, or less subject to threat than previously believed. Of the dozen candidate species known to occur on the NTS, Beatley milkvetch (*Astragalus beatleyae)* appeared to be the most vulnerable and consequently efforts focused on the distribution, habitat requirements, and ecology of this species during the 80's and early 90's (Sauls et al. 1980; Collins and O'Farrell 1984; O'Farrell and Collins 1984; EG&G/Energy Measurements, Inc. [EG&G/EM]1988; Blomquist et al. 1992). In 1995 a comprehensive treatment on the distribution and status of the remaining 11 candidate species was published by Blomquist et al. (1995). This document represented the culmination of several years of field studies and herbaria searches. This information, like other studies, was disseminated to federal and state agencies and other interested parties.

A couple years after the report by Blomquist et al. (1995), the FWS issued a notice of review containing a list of candidate plant species and plants proposed for listing (United States Department of Interior [USDI] 1997). They (FWS) had sufficient information on the 12 candidate plant species known to occur on the NTS to recommend that all 12 species no longer be considered for listing. In 1995 Bechtel Nevada (BN) became aware of the potential occurrence of Clokey's eggvetch (*Astragalus oophorus clokeyanus)* on the NTS. Clokey's eggvetch was still listed as a candidate plant species by the FWS (USDI 1997) but its distribution was thought to be restricted to the Spring Mountains some 64-80 km (40-50 miles) southwest of the NTS and therefore, surveys had never been conducted for this species on the NTS.

This document reports information obtained during field surveys for Clokey's eggvetch on the NTS over the past three years. This document contains the results of literature and herbaria searches, and field surveys. Field surveys covered much of the potential range of this species on the NTS and were conducted by BN botanists in 1996, 1997, and 1998 (BN 1996, 1997). This document reflects the continued efforts of DOE/NV to identify potentially sensitive plant species on the NTS and to provide the necessary protection to insure their continued existence.

2.0 BACKGROUND

Clokey's eggvetch is currently listed as a candidate species under the listing guidelines of the ESA. It was originally listed as threatened (USDI 1975), mainly because it was considered a "highly localized plant." Over the next four years, this species, like others listed for the state of Nevada, was closely reviewed by those familiar with the distribution of plants in the state of Nevada. The results of this series of threatened and endangered plant workshops were recommendations for each of the species under consideration. It was recommended that Clokey's eggvetch be listed as threatened in 1980 (Mozingo and Williams 1980). The FWS formally listed it as a candidate category 1 plant in 1980 (USDI 1980), which means that there was sufficient information available to list the species under the guidelines of the ESA. This status continued until 1997 (USDI 1983, 1985, 1990, 1993, 1996, 1997) at which time the category 1 designation was dropped and it was listed as a candidate species with a listing priority of 3.

Clokey's eggvetch is not currently listed by the state of Nevada as a species of concern (Morefield and Knight 1992, 1994, 1995, 1997). It is, however, listed by the Northern Nevada Native Plant Society (NNNPS) as Threatened and the Nevada Natural Heritage Program (NVNHP) ranks the plant as "G4T1S1." The later ranking means that at the species level "it is apparently secure, though frequently quite rare in parts of its range, especially at its periphery, however at the infraspecific and taxonomic level it is critically imperiled due to extreme rarity, imminent threats, or biological factors" (Morefield and Knight 1997).

The plant was first collected in 1937 in the Spring Mountains (Nachlinger and Sheldon 1995). It was later collected by I.W. Clokey in 1951 (Clokey 1951) and several collectors have documented its distribution since that time, but only in the Spring Mountains (Morefield 1993; Nachlinger and Sheldon 1995). Botanists working for The Nature Conservancy (TNC) located a specimen of Clokey's eggvetch in the Belted Range at Indian Springs which is approximately 8 kilometers (5 miles) north of the NTS within the boundaries of the Nellis Air Force Bombing and Gunnery Range (Knight and Smith 1996). This find was significant based on its previously known distribution in the Spring Mountains, some 129 kilometers (80 miles) to the south, southeast of the Belted Range. Habitat similar to that observed at Indian Springs is known to occur on the NTS. However, endangered and threatened plant surveys previously conducted on the NTS (Rhoads and Williams 1977; Rhoads et al. 1978; Beatley 1977a, 1977b; Collins and O'Farrell 1984) did

not include Clokey's eggvetch because its distribution was believed to be restricted to the Spring Mountains.

3.0 METHODS

The first step in identifying potential habitat and survey areas for Clokey's eggvetch on the NTS was to conduct a search of known locations of this species in the near vicinity. The University Nevada at Las Vegas (UNLV) and Mercury (NTS) herbaria were searched for speciments of Clokey's eggvetch, and a closely related species, egg milkvetch (*Astragalus oophorus* var. *oophorus*). Egg milkvetch was included because the collection of Clokey's eggvetch at Indian Springs was a reported location of egg milkvetch. The specimens collected by TNC at Indian Springs were verified by R. C. Barneby and by S. L. Welsh as Clokey's eggvetch (Knight and Smith 1996).

Familiarity with known habitat of Clokey's eggvetch was made possible through the cooperation of TNC and the U.S. Air Force. A BN botanist accompanied Dr. Frank Smith to the Indian Springs location on the Nellis Air Force Range in the spring of 1996. Photographs were taken and notes made on distinguishing characteristics of Clokey's eggvetch and overall characteristics of its habitat.

Field surveys focused on two general areas, those sites where egg milkvetch had previously been collected (Beatley 1976) and in habitat similar to the habitat observed at Indian Springs. Surveys were conducted in May and June when most plants bore mature fruits and positive identification was possible. Meandering survey techniques were used.

The number of field survey days in 1996 was limited due to marginal growing conditions. Approximately four to five days were spent conducting field surveys. Surveys were conducted at prior egg milkvetch sites near Grass Spring Canyon, Silent Canyon, and Echo Peak on Pahute Mesa. Similar habitat in Kawich Canyon, which is located in the Belted Range about eight kilometers (five miles) south of Indian Springs, was also surveyed. Specimens collected during the 1996 field surveys were verified (Welsh 1996).

Optimal growing conditions in 1997 yielded successful field surveys over a three week period in May and June. Four 2-person crews completed approximately 25 survey days. The areas of focus in order of priority were: the southern extension of the Belted Range along the northern boundary of the NTS, primarily Kawich Canyon; previously reported locations of egg milkvetch on Pahute Mesa, specifically in the vicinity of Echo Peak and Grass Spring Canyon; and a reported collection site for egg milkvetch at Captain Jack Spring in the Eleana Range. As time and manpower permitted, surveys expanded into potential habitat such as Lambs Canyon, Silent Canyon, and Falcon Canyon on Pahute Mesa and Aqueduct Mesa, Mouse Meadows, and Gold Meadows in the vicinity of Rainier Mesa. A previously reported collection site for egg milkvetch off of the NTS near Cedar Pass on the Tonopah Test Range was also searched.

Although much of the potential habitat for Clokey's eggvetch on the NTS had been searched and previous locations of egg milkvetch had been revisited, a couple of areas remained to be surveyed in 1998. Approximately three survey days were used to conduct some limited surveys for Clokey's eggvetch in the Timber and Shoshone Mountains. One suspected location of Clokey's eggvetch that was found late in the 1997 growing season in the Eleana Range was searched.

A modified version of the NVNHP field inventory form (See Appendix I) was used to record pertinent information at each location where Clokey's eggvetch was found. Universal transverse mercator (UTM) coordinates were recorded and survey areas were plotted on 7.5' topographic maps. Information on the NVNHP field inventory form was transferred to a NTS Sensitive Plant Species Database maintained by BN for DOE/NV. Survey locations and locations of Clokey's eggvetch were digitized and added to the existing Geographic Information System (GIS) coverage of candidate or sensitive plant species (Blomquist et al. 1995).

4.0 RESULTS AND DISCUSSION

4.1 Description

Clokey's eggvetch is a grey-green to dark green perennial forb, typically 5-10 centimeters (cm) (2-4 inches) tall and up to 30 cm (12 inches) wide (Figure 1). Flowers are bicolored bright reddish-purple and white. The fruit is a strongly inflated, mottled reddish, unilocular pod with 23-28 ovules/pod (Kartesz 1988). Clokey's eggvetch flowers in May and June with fruit and seed set by late June and July. Clokey's eggvetch is differentiated from egg milkvetch by its smaller flowers (calyx 6 millimeters [mm] [0.2 inches], banner 9 mm [0.4 inches], keel 9.5 mm [0.4 inches] as compared to calyx 7-12 mm [0.3-0.5 inches], banner 16-23 [0.6-0.9 inches], and keel 11.5-16 mm [0.5-0.6 inches]) and lesser number of ovules (28/pod for Clokey's eggvetch and 41-53/pod for egg milkvetch). A full description of the variety is given in Barneby (1964, 1989), Nachlinger (1995) and Knight and Smith (1996).

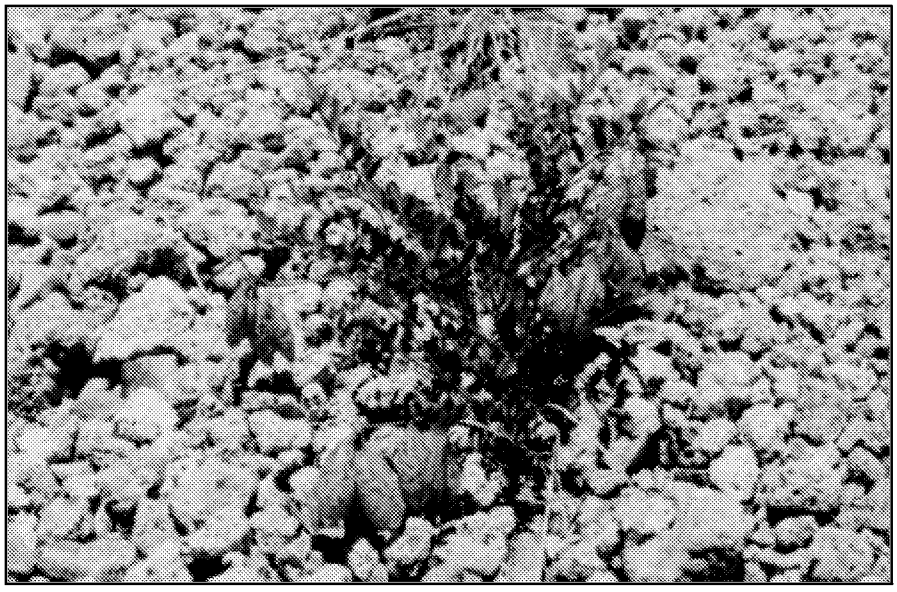

Figure 1. Clokey's eggvetch with mature fruits

4.2 Distribution

4.2.1 Herbaria Searches

Two collections of Clokey's eggvetch were found in the UNLV herbarium, both were collections from the Spring Mountains by F. J. Smith and J. Nachlinger in 1993. There were no collections of Clokey's eggvetch in the NTS herbarium. There were ten collections of egg milkvetch from southwestern Nevada in the UNLV herbarium, but only one collection at Captain Jack Spring in the Eleana Range was on the NTS. There were collections of egg milkvetch from the Magruder and Grapevine Mountains to the west of the NTS and from the Clan Alpine and Toiyabe mountain ranges north of the NTS. There were five collections of egg milkvetch in the NTS herbarium; two from locations on the NTS at Grass Spring Canyon and the lower canyon below Pahute Mesa. Other locations near the NTS were at Oak Springs and Johnnie's Water Canyon in the Belted Range just north of the northern boundary of the NTS; Cedar Pass in the Kawich Range located on the Tonopah Test Range; and the Stonewall Mountains to the west and north of the NTS also on the Tonopah Test Range. A complete listing of the results of the herbaria searches is in Appendix II.

4.2.2 Field Surveys

Prior to 1995, Clokey's eggvetch was known from as many as 13 different sites, but all in the Spring Mountains (Nachlinger and Sheldon 1995). In 1995, a collection made at Indian Springs in the Belted Range some129 kilometers (80 miles) north of the Spring Mountains, was verified to be Clokey's eggvetch (Knight and Smith 1996). In 1996, two of the three locations of egg milkvetch on the NTS were surveyed as was potential habitat for the species in Kawich Canyon. Surveys in the Grass Spring Canyon area were unsuccessful in locating egg milkvetch or Clokey's eggvetch. However, during a survey in a canyon below Pahute Mesa east of Echo Peak, several specimens of what was previously reported as egg milkvetch were collected. Plants were found along a small streambed and a few meters up the slope out of the wash. A few plants were found growing in a road that parallels the wash. The specimens were verified to be Clokey's eggvetch (Welsh 1996). Surveys in Kawich Canyon in 1996 were not successful. Only a single specimen in vegetative condition was found late in the season in lower Kawich Canyon. No fruits were present and positive identification was not possible. At the conclusion of 1996, Clokey's eggvetch was known to occur on the NTS but its distribution was uncertain.

In the ensuing year, surveys for Clokey's eggvetch again focused on those areas where egg milkvetch had previously been collected on the NTS (Figure 2). Early surveys in 1997 began in the Echo Peak area where it had been collected the previous year. Clokey's eggvetch was found at a site north and west of Echo Peak near the ridge top, unlike the typical wash bottoms where it was found the year before. It was also located throughout the bottoms and mid slopes of upper Falcon Canyon. Another reported location of egg milkvetch at Captain Jack Spring in the Eleana Range was located in 1997 (Figure 3). The plants at that site were confirmed to be Clokey's eggvetch. The population at Captain Jack Spring was first located below the spring, but surveys later on in the summer located several

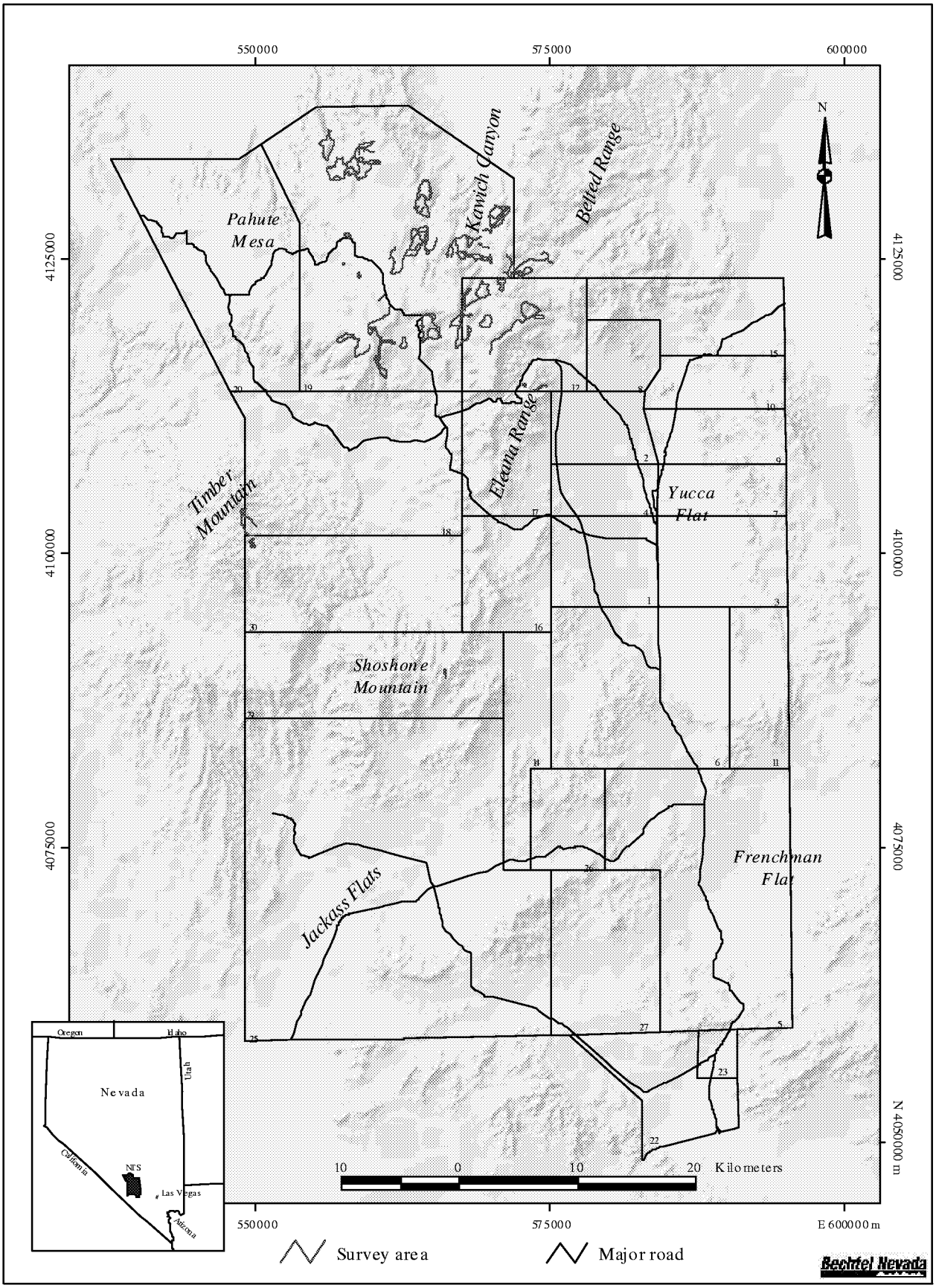

Figure 2. Areas surveyed for Clokey's eggvetch on and adjacent to the NTS

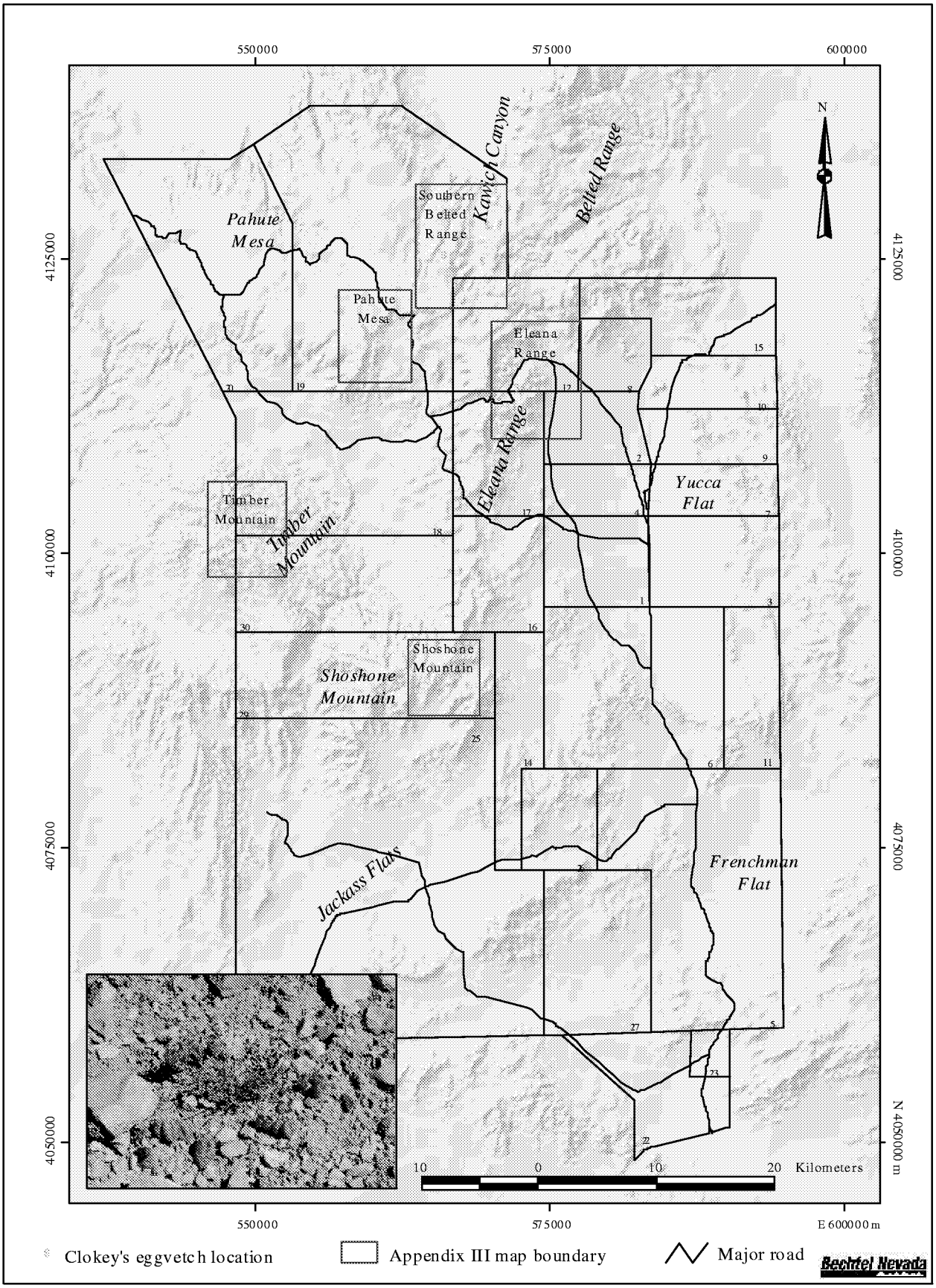

Figure 3. Distribution of Clokey's eggvetch on and adjacent to the NTS

plants west of the Spring in an adjacent canyon. The plants appeared to be Clokey's eggvetch, but because they were partially dried out, positive identification was not possible. The site was visited the following year and specimens were verified to be those of Clokey's eggvetch.

There was a collection of egg milkvetch in the Grass Spring Canyon area on Pahute Mesa. The area was surveyed in 1996 and in 1997; both proved to be unsuccessful (Figure 2) in locating egg milkvetch or Clokey's eggvetch. One previously reported site of egg milkvetch at Cedar Pass in the Kawich Range, which is off the NTS, was opportunistically relocated in 1997. The specimens found there were identified as Clokey's eggvetch, which represents the northern-most collection of this species to date.

Potential habitat for Clokey's eggvetch in the southern extension of the Belted Range was also surveyed in 1997 (Figure 2). Clokey's eggvetch was found at several sites in Kawich Canyon, along the westerly slope of Gritty Gulch, and at the head of Lambs Canyon. It was found on the steep west-facing slopes of Kawich Canyon, near the northern boundary of the NTS, where the canyon opens into Kawich Valley. It was found about midway between the mouth and the top of Rainier Mesa, and up a couple of draws on the west side of the canyon,. One site was near the wash bottom and the other was at the head of a major draw almost 0.8 kilometers (0.5 mile) from the main stream channel in Kawich Canyon (Figure 3). Surveys of Gold Meadows, and Mouse Meadows proved to be unsuccessful (Figure 2). By the end of the 1997 field season, the distribution of Clokey's eggvetch on the NTS appeared to be around Echo Peak on Pahute Mesa, Captain Jack Spring in the Eleana Range, and north through Kawich Canyon.

In 1998, field surveys focused on potential habitat for the Clokey's eggvetch on Timber Mountain (Figure 2). It was considered to be the only other area on the NTS where Clokey's eggvetch might occur. In late May, a relatively large population of Clokey's eggvetch was found north and east of the southern peak of Timber Mountain (Figure 3). Plants were found from wash bottom to mid to upper slope and from the head of the drainage to near the mouth where it flows into Cat Canyon. A week later a smaller site was located in a drainage south and east of the northern peak of Timber Mountain. Fewer plants were found compared to the site near the south peak. The presence of Clokey's eggvetch on Timber Mountain was documented, but time did not allow more extensive surveys of the area to clearly define its distribution.

During the 1998 field season, a crew of botanists opportunistically located a population of Clokey's eggvetch on Shoshone Mountain north of the summit along the old Shoshone Trail (Figure 3). The site is along a drainage off the north slope of Shoshone Mountain and extends close to a 0.8 kilometers (0.5 mile) down the draw. Plants were not abundant in any one location, but they were commonly found from just under the summit to midway down the draw and up several side draws. The Timber Mountain locations and the Shoshone Mountain location are significant in that they are well south of other collections of the species in the Belted Range (Figure 3) and represent a more clearly defined bridge or link to the Spring Mountain populations of Clokey's eggvetch.

4.3 Habitat

On the NTS, Clokey's eggvetch is typically located above 1830 meters (m) (6000 feet [ft]) in association with single-leaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and big sagebrush (*Artemisia tridentata* ssp. *tridentata*). It is commonly found along washes or small draws, but is also found on slopes approaching 35°. Soils are typically sandy loams and substrate is characterized by a light tuffaceous rock (Figure 4). It is commonly shaded by shrubs and trees, but occasionally is found along open, exposed washes or hillsides.

Figure 4. Typical habitat for Clokey's eggvetch in Kawich Canyon

There is some variation between some of the sites, but overall there appears to be three different substrates within the pinyon-juniper habitat where Clokey's eggvetch was found on the NTS. One substrate is typically found along wash bottoms, similar to the site visited at Indian Springs on the Tonopah Test Range (TTR). This habitat is characterized by a loose, gravelly, sandy loam (Figure III-12). Similar sites occur on the NTS on the east side of Echo Peak, and at Captain Jack Springs in the Eleana Range. Clokey's eggvetch occurred along wash bottoms and several plants were found in a road paralleling the wash. At Captain Jack Spring plants were located along the bottom of a wash flowing east from the spring (Figure III-3). The other two substrates where Clokey's eggvetch is commonly found are on side slopes. One is characterized by a tannish tuffaceous material (Figure 4) and was most common at the sites in Kawich Canyon. The surface particles are 1-3 cm (0.5-1") in size, loose on the surface, and have minimal soil exposure. Most sites are near the bottom of the slope. The other substrate is a typical rocky slope in the pinyon-juniper community and is characterized by a more stable rocky surface and greater exposure of the sandy loam soils. Such habitat was found at the head of Gritty Gulch, Lambs Canyon, the east side of Echo Peak (Figure III-1) and Timber Mountain (Figure III-7). They are typically near the bottom of the slope.

The plants found along the Shoshone Trail were not in the typical pinyon-juniper. Near the top of the draw Clokey's eggvetch was found in gambel oak (*Quercus gamelii*) and big sagebrush (Figure III-9). Further down the draw, plants were more commonly found in side draws where single-leaf pinyon and Utah juniper were common.

5.0 ASSESSMENT OF STATUS

Upon completion of the field surveys in 1997, it appeared that there might be two populations of Clokey's eggvetch, the historic population in the Spring Mountains and another in the Belted Range. However, after finding it in both the Timber and Shoshone Mountains, the Spring Mountain population appears to be the southern-most extension of the species, and its distribution extends north via Shoshone Mountain, Timber Mountain, Pahute Mesa, Eleana Range, Belted Range, and Kawich Range. The information obtained over the last few years on the distribution of Clokey's eggvetch is probably still incomplete. There are several other sites where this species might be found. It could be found further north in both the Kawich and Belted Ranges. To the west, potential locations include the Magruder Mountains, Stonewall Mountains, and Grapevine Mountains. Egg milkvetch has been reported from each of these locations. To the east, it most likely occurs at Johnnie's Water Canyon, which is an extension of the Indian Springs site, and there is a possibility that it could be found in the Groom Range or Sheep Range, the next ranges to the east of the Belted Range. Regionally, Clokey's eggvetch is still localized, found only in south central Nevada.

The populations of Clokey's eggvetch on the NTS appear to be vigorous and do not appear threatened. Based on field surveys over the last three years, it is estimated that there are close to 2300 individual plants of Clokey's eggvetch on the NTS (Table 1). In addition, over 1800 were reported from the Spring Mountains (Nachlinger and Sheldon, 1995) and an undetermined number in the northern Belted and Kawich Ranges. There have been no ecological studies conducted on this species on the NTS. However, the populations of Clokey's eggvetch collected by others in the 1960s and 1970s (Appendix II) have been relocated these last three years, and several new locations of the species have been added. Confirmation of historical sites and locating new sites would indicate a stable population of Clokey's eggvetch on the NTS.

There do not appear to be any threats to the continued existence of this species. Of the known locations of Clokey's eggvetch, the sites that would most likely be impacted are those found in the Spring Mountains. The expanded use of the Spring Mountains by the increasing population in the Las Vegas Valley could pose a significant threat to the stability of those sites. Protective measures, cooperative agreements, etc., may be necessary to minimize and/or ameliorate possible impacts. Plants found on the NTS are in remote locations and are unlikely to be developed or impacted. At a few of the sites there was evidence of insect damage. Several plants were encased in a webbing, and insects had burrowed into the seed pods and had foraged on the young developing seeds. These incidents were uncommon. The majority of the plants observed were vigorous. The only other threat to this species was by the nature of its habitat preference. Some plants were found close to the bottom of washes and, in some instances, were found in the flood plain where soils frequently move with the spring runoff or heavy summer thunderstorms. However, most of the locations were along the lower to mid slopes. The Cedar Pass location on the TTR is impacted by erosion. A road through a portion of the site acts as a channel for spring runoff and it was obvious this past spring (Figure III-11) that erosion along the road was severe.

Table 1. Estimated number of plants at major locations of Clokey's eggvetch on the NTS.

Mountain Range	Estimated # Plants				
	Total	Seedlings	Immature	Mature	Senescent
Pahute Mesa: Echo Peak Falcon Canyon	**645**	**20**	**265**	**360**	**0**
Eleana Range: Captain Jack Spring	**137+**	**10**	**15**	**102**	**10**
Southern Belted Range: Kawich & Lambs Canyon, Gritty Gulch	**1196+**	**41**	**921**	**234**	**0**
Timber Mountain: North and south peaks	**400+**	**0**	**0**	**400+**	**0**
Shoshone Mountain: Shoshone Trail	**115+**	**0**	**0**	**115+**	**0**

Clokey's eggvetch should still be considered a species of concern because of its localized distribution, but it does not appear to warrant protection under the ESA. The U.S. Forest Service, U.S. Department of Energy, U.S. Bureau of Land Management, U.S. Department of Defense, TNC, Northern Nevada Native Plant Society, NVNHP, and other agencies are aware of the existence of Clokey's eggvetch and it is unlikely that actions by any of these agencies would significantly impact it.

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APPENDIX I

FIELD DATA SHEETS
FROM
1996, 1997, and 1998 FIELD SURVEYS

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus *Astragalus* Species *oophorus* Var./Spp. *clokeyanus*
Date: Day/Month **21 May** Year **1997** Surveyors: **W.K. Ostler/F. Smith** Population #: **12-1** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Rainier Mesa**
Description of Location: Captain Jack Spring: Scattered Pinyon/Juniper Wash
Elevation: **1646** to **1750** m UTMs: **5-74 865** E; **41-13-952** N Geologic Map Unit: **G-Eleana Formation**
Collection: No Yes **W.K. Ostler** (Collector) _____ (Number) In NTS Herbarium: ____ (Date) ____ (Initials) Entered NTS Herbarium Database: ____ (Date) ____ (Initials)

General Site Description

Associated Species: Arlu, Artr, Ersa, Hemun, Quga, Rusa

Species of Same Genus:

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: Insects on fruits

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa [Wetland]

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Plotted ____ Date ____ Initials
T&E Db ____
GIS Db ____

Habitat Description / Age Structure/Phenology (enter number of plants in each category)

	Aspect: Flat N S [E] W NE SE NW SW	Slope: Flat [0-10] 10-35 35+vertical	Position: crest upperslope midslope lowerslope [bottom]	Light: [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1						5				22		
Area #2	Aspect: Flat N S E W NE SE NW SW	Slope: Flat 0-10 10-35 35+vertical	Position: crest upperslope midslope lowerslope bottom	Light: open partial filtered shade								
Area #3	Aspect: Flat N S E W NE SE NW SW	Slope: Flat 0-10 10-35 35+ vertical	Position: crest upperslope midslope lowerslope bottom	Light: open partial filtered shade								
Summary						5				22		

Comments: **Captian Jack Spring in wetland. Migu, Vean, Arlu, Brte, Rusa, Pobi, Ca**

BNES-408 (5/97)

I-1

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **7 July** Year **1997** Surveyors: **D.J. Hansen/J.E. Bartz** Population #: **A12-2** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Rainier Mesa**
Description of Location: Captain Jack Spring: White gravelly soils in P/J habitat-white rocks otherside of Mtn from Captain Jack Spring
Elevation: **1798** to **1828** m UTMs: **5-73-082** E; **41-13-791** N Geologic Map Unit: **Not Available**
Collection: No Yes **D.J. Hansen** _____ In NTS Herbarium: _____ _____ Entered NTS Herbarium Database: _____ _____
Collector Number Date Initials Date Initials

General Site Description

Associated Species: CORA, PUTR, JUOS, ARNO, ARTR, ERMI, PIMO, SYLO, TEAX, CHVI, QUGA, HEMUN, EROV, ERCA, ORCO, POSE, ELEL

Species of Same Genus: ASLE

Abundance: Rare Widely Scattered Common Locally Abundant Abundant

Evidence of Repro: No Yes-Asexual Sexual

Threats/Concerns: Herbivory Disease Disturb Other: None

Veg Map Unit: **Great Basin-** Gambels oak Pinyon-juniper Sagebrush Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: No Yes Sample No. _____

Plotted: Date Initials
T&E Db:
GIS Db:

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1	**Aspect:** N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade	**10**	**10**					**60/20***	**10**
Area #2	**Aspect:** N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #3	**Aspect:** N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary					**10**	**10**					**60/20**	**10**

Comments: Horse trails in area possibly leading to Captain Jack springs Pods very dry, leaves still green *60 plants mature, 20 with seed

BNES-408 (5/97)

I-2

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **June 10** Year **1998** Surveyors: **D. C. Anderson** Population #: **12-2** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Rainier Mesa**
Description of Location: West of Captain Jack spring and opposite side of mountain of other population of ASOOCL (12-1), east of G tunnel
Elevation: **1890** to **1905** m UTMs: **572722** E; **4114056** N Geologic Map Unit: **Not Available**
Collection: No Yes **D.C. Anderson** (Collector) **1263** (Number) In NTS Herbarium: ____ (Date) _____ (Initials) entered NTS Herbarium Database: ____ (Date) _____ (Initials)

General Site Description												
Associated Species: ARTR, QUGA, ERMI, BRTE, STCO, PUST, CHDO, ELELE, CORA, CHVI, HEMUN				**Species of Same Genus:** None		**Abundance:** Rare [Widely Scattered] Common Locally Abundant Abundant		**Evidence of Repro:** No [Yes]-Asexual [Sexual]		**Threats/Concerns:** Herbivory Disease Disturb Other: None		
Veg Map Unit: Great Basin- Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland						**Substrate:** Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____ Soil Sample Taken: No [Yes] Sample No. _____				Date (mm/dd) Plotted T&E DB GIS DB		
Area # 1	Habitat Description					Age Structure/Phenology (enter number of plants in each category)						
	Aspect: Flat N S E W NE SE NW [SW]	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest upperslope [midslope] [lowerslope] bottom	**Light:** [open] partial filtered shade		Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
						10+			**50-100**		**50+**		
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade									
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade									
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade									
Area #5	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade									
Summary						**10+**			**50-100**		**50+**		

Comments: Horse Trails in area possibly leading to Captain Jack Springs

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **June 15** Year **1998** Surveyors: **W. K. Ostler, D. C. Anderson** Population #: **18-1** RSL No. 1089
State: **NV** County: **NYE** 7.5' Topo map used: **Timber Mountain SW**
Description of Location: Timber Mountain: South slope of North Peak of Timber Mountain-along drainage
Elevation: **1966** to **2012** m UTMs: **549021** E; **4103465** N Geologic Map Unit: **Not Available**
Collection: No Yes **W. K. Ostler** (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description

Associated Species: PIMO, JUOS, ERRA, ERCA, PEHU, EPVI

Species of Same Genus: None

Abundance: Rare
Widely Scattered [Common]
Locally Abundant Abundant

Evidence of Repro:
No
[Yes]-Asexual [Sexual]

Threats/Concerns:
Herbivory Disease Disturb
Other: None

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush]
Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote
Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Date Initials
Plotted
T&E Db
GIS Db

	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W [NE] SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** open [partial filtered] shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1								100+				
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary								100+				

Comments: ELU 1500

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus *Astragalus* Species *oophorus* Var./Spp. *clokeyanus*
Date: Day/Month **12-13 May** Year **1997** Surveyors: **M.W. Fariss/D.B. Hall** Population #: **A19-1** RSL No. ______
State: **NV** County: **NYE** 7.5' Topo map used: **Ammonia Tanks**
Description of Location: Echo Peak: Along buried cable road west of Echo Peak Tower/over saddle and down Falcon Canyon bottom and side slopes
Elevation: **2104** to **2165** m UTMs: **5-60 808** E; **41-18-094** N Geologic Map Unit: **Not Available**
Collection: No Yes **D. Anderson** (Collector) ______ (Number) In NTS Herbarium: ______ (Date) ______ (Initials) Entered NTS Herbarium Database: ______ (Date) ______ (Initials)

General Site Description

Associated Species: ARTR, ARNO, PIMO, QUGA, PUTR, LUPINUS	**Species of Same Genus: ASLE, ASPU**	**Abundance:** Rare Widely Scattered Common **Locally Abundant** Abundant	**Evidence of Repro:** No **Yes**-Asexual **Sexual**	**Threats/Concerns:** Herbivory Disease Disturb Other: None

Veg Map Unit: **Great Basin-** Gambels oak **Pinyon-juniper Sagebrush** Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue ______ Value ______ Chroma ______
Soil Sample Taken: **No** Yes Sample No. ______

Date Initials
Plotted:
T&E Db:
GIS Db:

	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
					Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat **0-10** 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope **bottom**	**Light:** **open** partial filtered shade		20		2	3			
Area #2	**Aspect:** Flat **N** S **E** W NE SE NW SW	**Slope:** Flat 0-10 **10-35** 35+vertical	**Position:** crest **upperslope midslope** lowerslope bottom	**Light:** open **partial filtered** shade		8		15	12			
Area #3	**Aspect:** Flat N **S** E **W** NE **SE** NW SW	**Slope:** Flat **0-10 10-35** **35+** vertical	**Position:** crest upperslope **midslope** **lowerslope bottom**	**Light:** **open** **partial** **iltered shade**		155		39	194			
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary						165		56	209			

Comments: #1 on road in wash bottom, #2 on north & east facing slope to saddle that goes into Falcon Canyon, #3 South facing slope into Falcon Canyon; west facing slope; botttom of Falcon Canyon; one on east facing slope. GPS on saddle 5-60 797, 41 17 373; down wash 5 60 679, 41 16 298. Plants found 200 m south of downwash reading.

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **13 May** Year **1997** Surveyors: **C.A. Wills/K.W. Blomquist** Population #: **A19-2** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Dead Horse Flat**
Description of Location: Lamb Canyon: Head of Canyon
Elevation: **1982** to **2043** m UTMs: **5-65 450** E; **41-25-400** N Geologic Map Unit: **Tmr**
Collection: No Yes _____ (Collector) _____ (Number) In NTS Herbarium: ____ (Date) ____ (Initials) Entered NTS Herbarium Database: ____ (Date) ____ (Initials)

General Site Description

Associated Species: CHNA, CHVI, ARTR, QUGA, PUTR, LUPINUS, PEPA, PEKI

Species of Same Genus: ASLE, ASCA

Abundance: [Rare] Widely Scattered Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: Road Bed

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Date Initials
Plotted
T&E DB
GIS DB

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: [Flat] N S E W NE SE NW SW	**Slope:** [Flat] 0-10 10-35 35+vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area #1						2		3		4		
Area #2	**Aspect:** [Flat] N S E W NE SE NW SW	**Slope:** [Flat] 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** [open] partial filtered shade				1				
Area #3	**Aspect:** Flat N [S] E W NE SE NW SW	**Slope:** Flat [0-10] 10-35 35+ vertical	**Position:** crest upperslope [midslope] [lowerslope bottom]	**Light:** [open] partial iltered shade		27		25	14	47		
Area #4	**Aspect:** Flat N S E [W] NE SE NW [SW]	**Slope:** Flat [0-10 10-35] 35 +vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** [open] [partial] filtered shade		6		12	1	3		
Area #5	**Aspect:** Flat N S E [W] NE SE NW SW	**Slope:** Flat [0-10] 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** open [partial] filtered shade		3		3	2	2		
Summary						39		46	17	56		

Comments: Area 1 on road side, if no disturbance would be east facing midlsope and 1 plant w/50m up the wash, Area 3-many **in oak litter, also** on areas of lots of boulders

BNES-408 (5/97)

I-6

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **22 May** Year **1997** Surveyors: **D.C.Anderson/W. Fariss** Population #: **A19-2** RSL No.
State: **NV** County: **NYE** 7.5' Topo map used: **Dead Horse Flat**
Description of Location: Lamb Canyon: Top (southern) end of Lamb Canyon extension of site found by Wills/Blomquist. Plants found about 1/4 mile
Elevation: **1982** to **2043** m UTMs: **5-65 553** E; **41-26-043** N Geologic Map Unit: **Tmr**
Collection: No Yes _____ (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description

Associated Species: ARTR, PI/JU, KOCR, PEPA, OPUNTIA, CHVI, LEPTO, LUPINUS, PUTR, POSE, QUGA, PEHU

Species of Same Genus: ASLE-rare

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Co Herbivory Other:

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Plo T& GI

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each						
	Aspect: Flat N S E [W] NE SE NW [SW]	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd
Area #1						**10**		**16**	**2**	**18**	
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade							
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade							
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade							
Area #5	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade							
Summary						**10**		**16**	**2**	**18**	

Comments: _____

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus *Astragalus* Species *oophorus* Var./Spp. *clokeyanus*
Date: Day/Month **13 May** Year **1997** Surveyors: **D. C. Anderson** Population #: **A19-3** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Quartet Dome**
Description of Location: Kawich Canyon: West facing slope of steep ravine/wash-open eroded areas
Elevation: **2012** to **2104** m UTMs: **5-70 450** E; **41-26-550** N Geologic Map Unit: **Stockade Wash Member**
Collection: No Yes **D. Anderson** _____ In NTS Herbarium: ____ ____ Entered NTS Herbarium Database: ____ ____
Collector Number Date Initials Date Initials

General Site Description

Associated Species: EPVI, PEPA, RIAU, ASTER, SYOR, PI/JU, ORHY, PHLOX, ARTR, BRICKELIA, PUTR, CHVI

Species of Same Genus: ASLE further down slope

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: Erosion

Veg Map Unit: Great Basin- Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Plotted: Date Initials
T&E Db:
GIS Db:

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E [W] NE SE NW SW	**Slope:** Flat 0-10 10-35 [35+]vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Fr	Sd Disprs	Dorm Snsct
Area # 1						2		2		4		
Area #2	**Aspect:** Flat N S E [W] NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest upperslope [midslope] lowerslope [bottom]	**Light:** [open] partial filtered shade		4				11		
Area #3	**Aspect:** Flat N S E [W] NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+ vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial iltered shade	11			11		1		
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade	12			5		6		
Area #5	**Aspect:** Flat N S [E] W NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+ vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade	16			7		8		
Summary					39	6		25		30		

Comments: **2-next draw to north, 3-north 100 m, 4-next draw to north, 5-opposite side of ridge**

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **13 May** Year **1997** Surveyors: **M.W. Fariss/D.B. Hall** Population #: **A19-4** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Ammonia Tanks**
Description of Location: Echo Peak: Just west and north of Echo Peak Tower
Elevation: **2104** to **2165** m UTMs: **5-60 089** E; **41-18-756** N Geologic Map Unit: **Not Available**
Collection: No Yes **D. Anderson** (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description

Associated Species: POSE, PIMIO, QUGA, SADO

Species of Same Genus: ASLE, ASCA

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: [Herbivory] Disease Disturb Other:

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Date Initials
Ploted
T&E Db
GIS Db

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S [E] W NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest [upperslope midslope] [lowerslope bottom]	**Light:** [open] [partial filtered] shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1						**20**		**100**	**80**			
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #5	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary						**20**		**100**	**80**			

Comments: From wash up to 30 m from crest; searched west facing slope;ridgetop and south facing slope and found nothing.

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **15 May** Year **1997** Surveyors: **D.C. Anderson/K.W Blomquist** Population #: **A19-5** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Quartet Dome/Dead Horse Point**
Description of Location: Gritty Gulch: Eastern side of head of Gritty Gulch
Elevation: **2043** to **2058** m UTMs: **5-66 750** E; **41-24-300** N Geologic Map Unit: **Trq #1, #2**
Collection: No Yes _____ (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description												
Associated Species: PUTR, PI/JU, ARTR, BROMUS, FRAT				**Species of Same Genus:**			**Abundance:** Rare Widely Scattered Common Locally Abundant Abundant		**Evidence of Repro:** No [Yes]-Asexual [Sexual]		**Threats/Concerns:** Herbivory Disease Disturb Other: None	
Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland							**Substrate:** Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____ Soil Sample Taken: [No] Yes Sample No. _____				Date Initials Plotted: T&E Db: GIS Db:	
	Habitat Description						Age Structure/Phenology (enter number of plants in each category)							
Area # 1	**Aspect:** Flat N S E [W] NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest [upperslope] midslope lowerslope bottom	**Light:** [open] partial filtered shade			Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
								18		**40**	**18**	**18**		
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial [filtered] shade				**2**		**2**	**2**	**1**		
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade										
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade										
Summary								**20**		**42**	**20**	**19**		

Comments: _____

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **15 & 22 May** Year **1997** Surveyors: **D.C. Anderson/K.W Blomquist** Population #: **A19-6** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Quartet Dome**
Description of Location: Kawich Canyon: Drainage flowing east into Kawich Canyon
Elevation: **1997** to **2050** m UTMs: **567550/567850** E; **4124090/4122550** N Geologic Map Unit: **Tpb, Trq**
Collection: No Yes D. Anderson (Collector) 150/185 (Number) In NTS Herbarium: ____ (Date) ____ (Initials) Entered NTS Herbarium Database: ____ (Date) ____ (Initials)

General Site Description			
Associated Species: ARTR, JUOS, PIMO, EPVI, ERGR, PUTR, ORHY, QUGA, RIAU, BRIKELLIA, PEPA, POSE, POFE, KOCR, CRYPANTHA	**Species of Same Genus: ASLE, ASCA**	**Abundance:** Rare Widely Scattered [Common] Locally Abundant Abundant	**Evidence of Repro:** No [Yes]-Asexual [Sexual]	**Threats/Concerns:** Herbivory Disease Disturb Other: None
Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland		**Substrate:** Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____ Soil Sample Taken: [No] Yes Sample No. _____		Date Initials Plotted T&E Db GIS Db

	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W NE [SE] NW SW	**Slope:** Flat 0-10 [10-35] [35+]vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] [partial] filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1						**23**	**4**	**4**	**4**	**36**		
Area #2	**Aspect:** Flat N S E W [NE] SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope [midslope] lowerslope [bottom]	**Light:** open partial filtered [shade]		**1**						
Area #3	**Aspect:** Flat N S E W [NE] SE NW SW	**Slope:** Flat [0-10] 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** open partial [filtered] shade		**3**		**3**				
Area #4	**Aspect:** Flat [N] S E W NE SE NW SW	**Slope:** Flat [0-10] 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** open partial [filtered] shade	**2**	**2**	**2**	**1**				
Summary					**2**	**29**	**6**	**8**	**4**	**36**		

Comments: Populations 1 and 2 found in bottom of wash and immediate slopes above, populations 3 and 4 were in drainage on opposite side of drainage, mainly in bottom of washes

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **15 May** Year **1997** Surveyors: **C.A. Wills/S. York** Population #: **A19-7** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Quartet Dome**
Description of Location: Kawich Canyon, in narrow wash with yellowish tuft gravels, under Pinyon Juniper
Elevation: **1860** to **1915** m UTMs: **5-69 200** E; **41-25-000** N Geologic Map Unit: **Trb, Qa**
Collection: No Yes **C. Wills** _____ (Collector / Number) In NTS Herbarium: _____ _____ (Date / Initials) Entered NTS Herbarium Database: _____ _____ (Date / Initials)

General Site Description

Associated Species: ARTR, JUOS, PIMO, LUPI, PUTR, ERIOGONUM

Species of Same Genus: ASLE, ASCAC

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: Cicada shells

Veg Map Unit: **Great Basin**- Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: No [Yes] Sample No. Kawich 5

Plotted: Date _____ Initials _____
T&E Db: Date _____ Initials _____
GIS Db: Date _____ Initials _____

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W [NE] SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope midslope [lowerslope bottom]	**Light:** open [partial filtered] shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
# 1									**>500**			
#2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
#3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
#4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary									**>500**			

Comments: Walked approx. 150 m up wash from road after seeing in road, estimate >500 plants, in wash on on side of wash where soils were small yellowish gravels, no plants on other side of wash with red broken roack and shallower soils

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **21 May** Year **1997** Surveyors: **C.A. Wills** Population #: **A19-8** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Quartet Dome**
Description of Location: East Kawich Canyon
Elevation: **1970** to **1988** m UTMs: **5-70 150** E; **41-24-400** N Geologic Map Unit: **Trs, Qa ,Tpb**
Collection: No Yes **C. Wills** _____ In NTS Herbarium: _____ _____ Entered NTS Herbarium Database: _____ _____
Collector Number Date Initials Date Initials

General Site Description

Associated Species: CRYPTANTHA, CHYSOTHAMNUS, PIMO, JUOS, ORHY, QUGA

Species of Same Genus: ASLE

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: None

Veg Map Unit: **Great Basin**- Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: No [Yes] Sample No. A19-8

Date Initials
Plotted:
T&E Db:
GIS Db:

Habitat Description / Age Structure/Phenology (enter number of plants in each category)

	Aspect	Slope	Position	Light	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1	**Aspect:** Flat [N] S E W NE SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade		>30			>20	>50		
Area #2	**Aspect:** Flat [N] S E W NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** [open] partial filtered shade		5		2		3		
Area #3	**Aspect:** Flat N [S] E W NE SE NW SW	**Slope:** Flat [0-10] 10-35 35+ vertical	**Position:** crest upperslope midslope [lowerslope] bottom	**Light:** [open] partial iltered shade		>20		2	2	7		
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade		30			>20	>15		
Summary						>85		4	>42	>75		

Comments: Area 1 next to wash, Area 2 on toe of hill, same soil type, more widely scattered, took collections from Area 1

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **22 May** Year **1996** Surveyors: D.C. Anderson, T. A. Lindemann Population #: **A19-9** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Ammonia Tanks**
Description of Location: Echo Peak: In canyon east of Echo Peak, along road leading to base of Echo Peak on east side, road comes from hiway to the east
Elevation: **2012** to **2100** m UTMs: _____ E; _____ N Geologic Map Unit: _____
Collection: No Yes **D. Anderson** (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description

Associated Species: POSE, PIMO, JUOS, ARTR, PEPA, LUPINUS

Species of Same Genus:

Abundance: Rare [Widely Scattered] Common Locally Abundant Abundant

Evidence of Repro: No [Yes]-Asexual [Sexual]

Threats/Concerns: Herbivory Disease Disturb Other: None Noted

Veg Map Unit: **Great Basin**- Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote Playa Wetland

Substrate: Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Plotted: Date Initials
T&E Db:
GIS Db:

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W NE [SE] NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** [open] partial [filtered] shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1									**15**			
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #5	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary						**20**		**100**	**80**			

Comments: Collected and verified by S. Welsh as *Astragalus oophorus clokeyanus*

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **May 27** Year **1998** Surveyors: **D. C. Anderson/W.K. Ostler** Population #: **29-1** RSL No. 1087
State: **NV** County: **NYE** 7.5' Topo map used: **Topopah Springs NE**
Description of Location: Shoshone Mountain: North slope of Shoshone Mountain, along old Shoshone trail go north off ridge top
Elevation: **1890** to **1965** m UTMs: **566423** E; **4089100** N Geologic Map Unit: **Not Available**
Collection: No Yes **D.C. Anderson** (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) Entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description			
Associated Species: ARTR, QUGA, ERMI, LUAP, PIMO, JUOS	**Species of Same Genus:** None	**Abundance:** Rare Widely Scattered [Common] Locally Abundant Abundant	**Evidence of Repro:** No [Yes]-Asexual [Sexual]	**Threats/Concerns:** Herbivory Disease Disturb Other: None
Veg Map Unit: Great Basin- [Gambels oak] Pinyon-juniper Sagebrush Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland		**Substrate:** Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____ Soil Sample Taken: [No] Yes Sample No. _____		Date - Initials Plotted T&E Db GIS Db

	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
Area	Aspect: Flat [N] S E W NE SE NW SW	Slope: Flat [0-10] 10-35 35+vertical	Position: crest upperslope midslope [lowerslope] bottom	Light: [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area #1								**25**		**90+**		
Area #2	Aspect: Flat N S E W NE SE NW SW	Slope: Flat 0-10 10-35 35+vertical	Position: crest upperslope midslope lowerslope bottom	Light: open partial filtered shade								
Area #3	Aspect: Flat N S E W NE SE NW SW	Slope: Flat 0-10 10-35 35+ vertical	Position: crest upperslope midslope lowerslope bottom	Light: open partial iltered shade								
Area #4	Aspect: Flat N S E W NE SE NW SW	Slope: Flat 0-10 10-35 35 +vertical	Position: crest upperslope midslope lowerslope bottom	Light: open partial filtered shade								
Summary								**25**		**90+**		

Comments: ELU 1207

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **June 9** Year **1998** Surveyors: **D. C. Anderson** Population #: **30-1**
State: **NV** County: **NYE** 7.5' Topo map used: **Timber Mountain SW**
Description of Location: Timber Mountain: North slope of south Peak of Timber Mountain-numerous drainages, all flowing
Elevation: **1830** to **1860** m UTMs: **549906** E; **4100077** N Geologic Map
Collection: No Yes **D.C. Anderson** (Collector) **1259** (Number) In NTS Herbarium: ____ (Date) ____ (Initials) Entered NTS Herbarium Data

General Site Description								
Associated Species: PIMO, JUOS, ARTR, TECA, EPVI, ELCI, POSE			**Species of Same Genus:** ASLE			**Abundance:** Rare Widely Scattered Common Locally Abundant [Abundant]		**Evidenc** No [Yes]-Ase
Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush] Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland						**Substrate:** Soil Color (Munsell soil colo Hue ____ Value ____ Chro Soil Sample Taken: [No] Yes Sample N		
	Habitat Description					Age Structure/Phenology (enter		
Area # 1	**Aspect:** Flat [N] S E W NE SE NW SW	**Slope:** Flat 0-10 [10-35] 35+vertical	**Position:** crest upperslope [midslope] [lowerslope] bottom	**Light:** open partial [filtered] shade		Seedling	Immature	Flwr bud	Flwring **100+**
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade					
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade					
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade					
Summary									**100+**

Comments: ELU 1193

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **1 May** Year **1997** Surveyors: **D. C. Anderson** Population #: **CP-1** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Cedar Pass**
Description of Location: Kawich Range: East slope of Cedar Pass-south side of road-near Cedar Pass springs along old road
Elevation: **2110** to **2140** m UTMs: **560810** E; **4176140** N Geologic Map Unit: **Not Available**
Collection: No Yes **D. Anderson** _____ In NTS Herbarium: ____ ____ Entered NTS Herbarium Database: ____ ____
Collector Number Date Initials Date Initials

General Site Description										
Associated Species: PIMO, JUOS, ASPU, ERCA, PHLO, ARNU, PEHU, LUPINUS		**Species of Same Genus:**			**Abundance:** Rare [Widely Scattered] Common Locally Abundant Abundant		**Evidence of Repro:** No [Yes]-Asexual [Sexual]		**Threats/Concerns:** Herbivory Disease Disturb Other: None	
Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] Sagebrush Blackbush Shadscale **Mojave Desertscrub-** Joshua tree Lycium Creosote Playa Wetland					**Substrate:** Soil Color (Munsell soil color chart) Hue _____ Value _____ Chroma _____ Soil Sample Taken: [No] Yes Sample No. _____				Date Initials Plotted T&E Db GIS Db	
	Habitat Description				Age Structure/Phenology (enter number of plants in each category)					
Area # 1	**Aspect:** Flat N S E W [NE] SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope [bottom]	**Light:** [open] partial filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
						17		**10**	**30**	**15**		
Area #2	**Aspect:** Flat N S E [W] NE SE NW SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope [midslope] lowerslope bottom	**Light:** open [partial] filtered shade								
						1						
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary						**18**		**10**	**30**	**15**		

Comments: _____

BNES-408 (5/97)

CANDIDATE PLANT SURVEY FORM

Name of Candidate Plant: Genus ***Astragalus*** Species ***oophorus*** Var./Spp. ***clokeyanus***
Date: Day/Month **May 18** Year **1996** Surveyors: **D. C. Anderson** Population #: **IS-1** RSL No. _____
State: **NV** County: **NYE** 7.5' Topo map used: **Wheelbarrow Peak**
Description of Location: Indian Springs Trail, south and west of Wheelbarrow Peak
Elevation: **1935** to **2012** m UTMs: _____ E: _____ N Geologic Map Unit: **Not Available**
Collection: No Yes _____ (Collector) _____ (Number) In NTS Herbarium: _____ (Date) _____ (Initials) entered NTS Herbarium Database: _____ (Date) _____ (Initials)

General Site Description

Associated Species: ARTR, PIMO, JUOS, ERNAL

Species of Same Genus: ASLE

Abundance: Rare
[Widely Scattered] [Common]
Locally Abundant Abundant

Evidence of Repro:
No
[Yes]-Asexual [Sexual]

Threats/Concerns:
Herbivory Disease Disturb
Other: Wrapped in insect web

Veg Map Unit: **Great Basin-** Gambels oak [Pinyon-juniper] [Sagebrush]
Blackbush Shadscale
Mojave Desertscrub- Joshua tree Lycium Creosote
Playa Wetland

Substrate: Soil Color (Munsell soil color chart)
Hue _____ Value _____ Chroma _____
Soil Sample Taken: [No] Yes Sample No. _____

Date Initials
Plotted:
T&E Db:
GIS Db:

Area	Habitat Description				Age Structure/Phenology (enter number of plants in each category)							
	Aspect: Flat N S E W [NE] SE [NW] SW	**Slope:** Flat [0-10] 10-35 35+vertical	**Position:** crest upperslope midslope [lowerslope] [bottom]	**Light:** [open] [partial] filtered shade	Seedling	Immature	Flwr bud	Flwring	Immat Frt	Mat Frt	Sd Disprs	Dorm Snsct
Area # 1						**15**			**2**	**1**		
Area #2	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Area #3	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35+ vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial iltered shade								
Area #4	**Aspect:** Flat N S E W NE SE NW SW	**Slope:** Flat 0-10 10-35 35 +vertical	**Position:** crest upperslope midslope lowerslope bottom	**Light:** open partial filtered shade								
Summary						**15**			**2**	**1**		

Comments: Accompanied by F. Smith

BNES-408 (5/97)

APPENDIX II

COLLECTIONS OF CLOKEY'S EGGVETCH AND EGG MILKVETCH IN UNIVERISITY OF NEVADA AT LAS VEGAS AND MERCURY HERBARIA

Results of Herbaria Searches

Astragalus oophorus var. *clokeyanus* (Clokey's eggvetch)

County	Collector	Date	Drainage Basin	Elev.	Vegetation Type	Location/Comments-Herbarium
Clark	Smith, Nachlinger	6/25/93	Spring Mts	8725	Oak Sagebrush	Just east of Wheeler Peak-UNLV
Clark	Smith, Nachlinger	6/25/93	Spring Mts	8758	Ponderosa Pine	UNLV

Astragalus oophorus var. *oophorus* (Egg milvetch)

County	Collector	Date	Drainage Basin	Elev.	Vegetation Type	Location/Comments-Herbarium
Nye	Cochrane Holland	5/20/78	E Eleana Range	5700	Oak Sagebrush	On volcanic tuff slopes below Capt Jack Spring-UNLV
Churchill	Pinzl	6/14/91	Clan Alpine Mts	6000	Lesquerella	War cyn, NW of Clan Alpine Ranch Road-UNLV
Esmeralda	Leary, et al	5/28/95	S of Magruder Mtn	6600	Pinyon Blacksage	SW of O'Hara Spring-UNLV
Esmeralda	Leary, et al	6/16/95	Magruder Mtn	6550	Blacksage Pinyon Juniper	S of NV Hwy 266, W of Lida-UNLV
Esmeralda	Leary, et al	6/27/95	Magruder Mtn	8700	Pinyon Blacksage	Magruder Ridge-UNLV
Eureka	Knight Kolar	6/6/88	Roberts Mts	6900	Pinyon Juniper Sagebrush	Gabel and Dry cyns-UNLV
Lander	Knight Kolar	6/23/88	Toiyabe Range		Pinyon Juniper Sagebrush	Historic Site of Ophir in Ophir Canyon, limestone gravels in road-UNLV
Nye	Beatley Kaaz	6/8/69	Belted Range	6800		Below Cliff Spring-UNLV
Nye	Williams	6/16/77		5600		Hwy 8A, near turn to N Twin river-UNLV
Nye	Kurzius Kingsley	5/23/80	Grapevine Mts	6800		Phinney cyn rd near mine, Death Valley NM-UNLV
Nye	Beatley	6/27/69	Belted Range	6700	Sagebrush Pinyon Juniper	Wash of Grass Spring Cyn, w. of U19u, NE Pahute Mesa-MERCURY
Nye	Beatley	6/12/71	Kawich Range	7000	Sagebrush Pinyon Juniper	Cedar Pass area along old Rt 25, occas. Small pls, mostly vegetative-MERCURY
Nye	Beatley	6/27/68	Pahute Mesa	6700	Sagebrush Pinyon Juniper	Lower cyn below Pahute Mesa, cable access rd from Pahute CP to Echo Peak-MERCURY
Nye	Beatley Rhoads	7/12/67	Belted Range, W. Groom	6400	Sagebrush Pinyon Juniper	Locally common, Johnnies Water Canyon, east slope of Belted Range-MERCURY
Nye	Beatley Smith	7/26/71	Stonewall Mts	6800-7000	Sagebrush Pinyon Juniper	Local, esp. on disturbed sites, vic. Ruins in cyn on NE side of Stonewall Mtn-MERCURY

APPENDIX III

SITE DESCRIPTIONS

Pahute Mesa

Figure III-1. Clokey's eggvetch northwest of Echo Peak.

Habitat Description

Population: **Pahute Mesa**	Description: **Falcon Canyon, west of Echo Peak, east of Echo Peak**		
Elevation: **6600-7100**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Loam**
Disease: **None**	Aspect: **East, Southeast**	Slope: **0-30**	# of Plants: **645**
Topographic Position: **Bottom to upper slope**		Light: **Open to filtered**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)

Shrubs
Artemisia nova (Black sagebrush)
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Chrysothamnus viscidiflorus ssp. *viscidiflorus* (Sticky green rabbitbrush)
Ephedra viridis (Mormon tea)
Leptodactylon pungens (Granite pricklygilia)
Salvia dorii ssp. *dorrii* var. *dorrii* (Dorr's sage)

Grasses
Bromus tectorum (Cheatgrass)
Elymus elymoides ssp. *elymoides* (Bottlebrush squirreltail)
Poa secunda (Sandberg's bluegrass)

Forbs
Astragalus lentiginosus var. *micans* (Speckledpod milkvetch)
Astragalus purshii var. *tinctus* (Woollypod milkvetch)
Castilleja applegatei (Wavyleaf Indian paintbrush)
Cryptantha virginensis (Virgin River catseye)
Erigeron concinnus var. *concinnus* (Navajo fleabane)
Lupinus argenteus ssp. *argenteus* var. *laxiflorus* (Spur lupine)
Senecio multilobatus (Lobeleaf groundsel)
Streptanthus cordatus var. *cordatus* (Heartleaf twistflower)

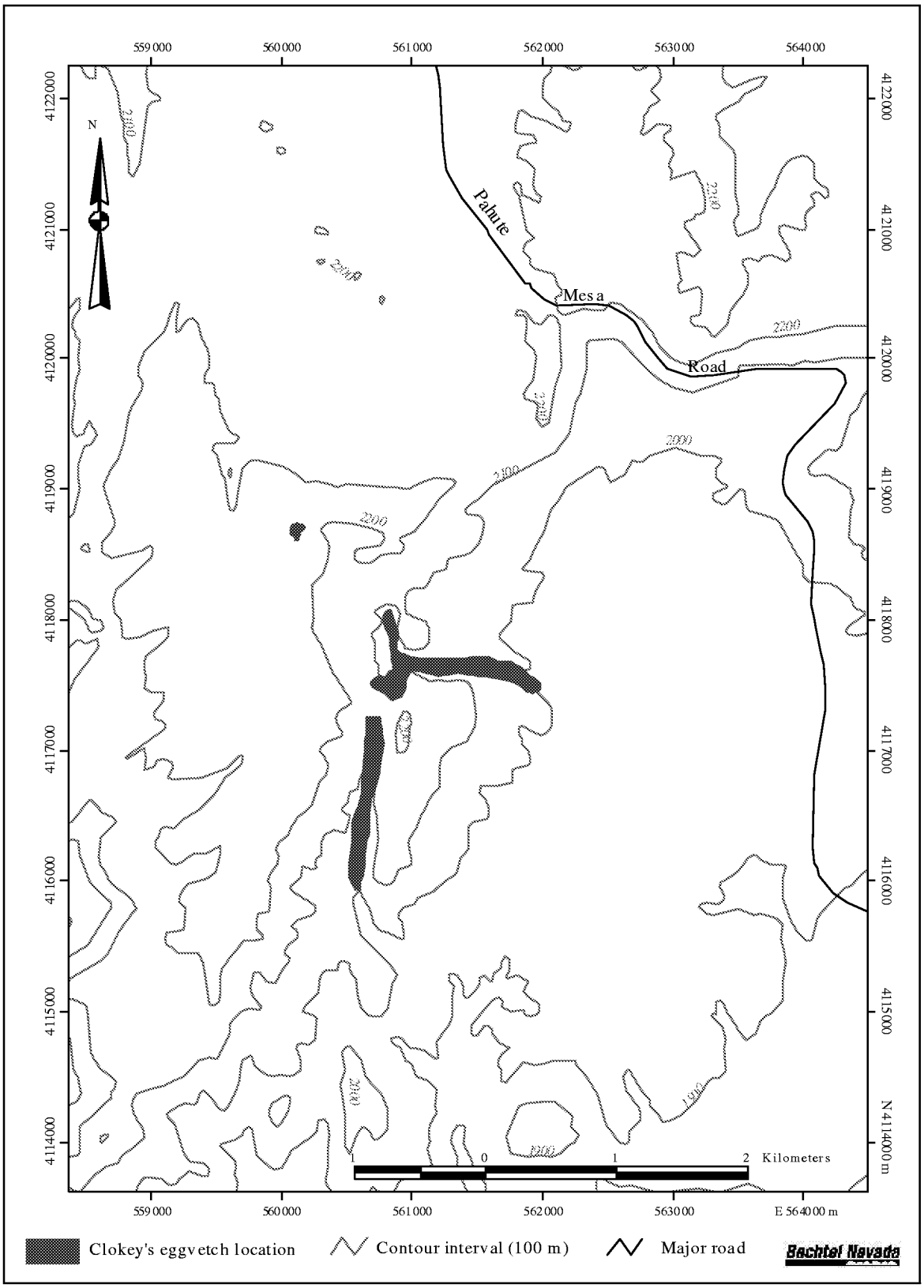

Figure III-2. Distribution of Clokey's eggvetch on Pahute Mesa (Echo Peak)

Eleana Range

Figure III-3. Clokey's eggvetch along wash east of Captain Jack Springs.

Habitat Description

Population: **Eleana Range**	Description: **East & west of Captain Jack Spring**		
Elevation**: 5400-6000**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Sandy Loam, Tuffaceous**
Disease: **Yes**	Aspect: **East, Southwest**	Slope: **0-30**	# of Plants: **137+**
Topographic Position: **Mid to bottom slope**		Light: **Open**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)
Quercus gambelii (Gambel oak)

Shrubs
Artemisia nova (Black sagebrush)
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Chrysothamnus viscidiflorus ssp. *viscidiflorus* (Sticky green rabbitbrush)
Coleogyne ramosissima (Blackbrush)
Eriogonum microthecum var. *simpsonii* (Simpson's buckwheat)
Purshia tridentata (Antelope bitterbrush)
Symphoricarpos longiflorus (Desert snowberry)
Tetradymia axillaris var. *axillaris* (Longspine horsebush)

Grasses
Bromus rubens (Foxtail brome)
Bromus tectorum (Cheatgrass)
Elymus elymoides ssp. *elymoides* (Bottlebrush squirreltail)
Pleuraphis jamesii (Galleta, galleta grass)
Poa secunda (Sandberg's bluegrass)

Forbs
Amsinckia tessellata (Bristly fiddleneck)
Chaenactis douglasii (Douglas' dustymaiden)
Eriogonum caespitosum (Matted buckwheat)
Eriogonum ovalifolium var. *ovalifolium* (Cushion buckwheat)
Heliomeris multiflora var. *nevadensis* (Nevada goldeneye)
Orobanche corymbosa (Flattop broomrape)
Streptanthus cordatus var. *cordatus* (Heartleaf twistflower

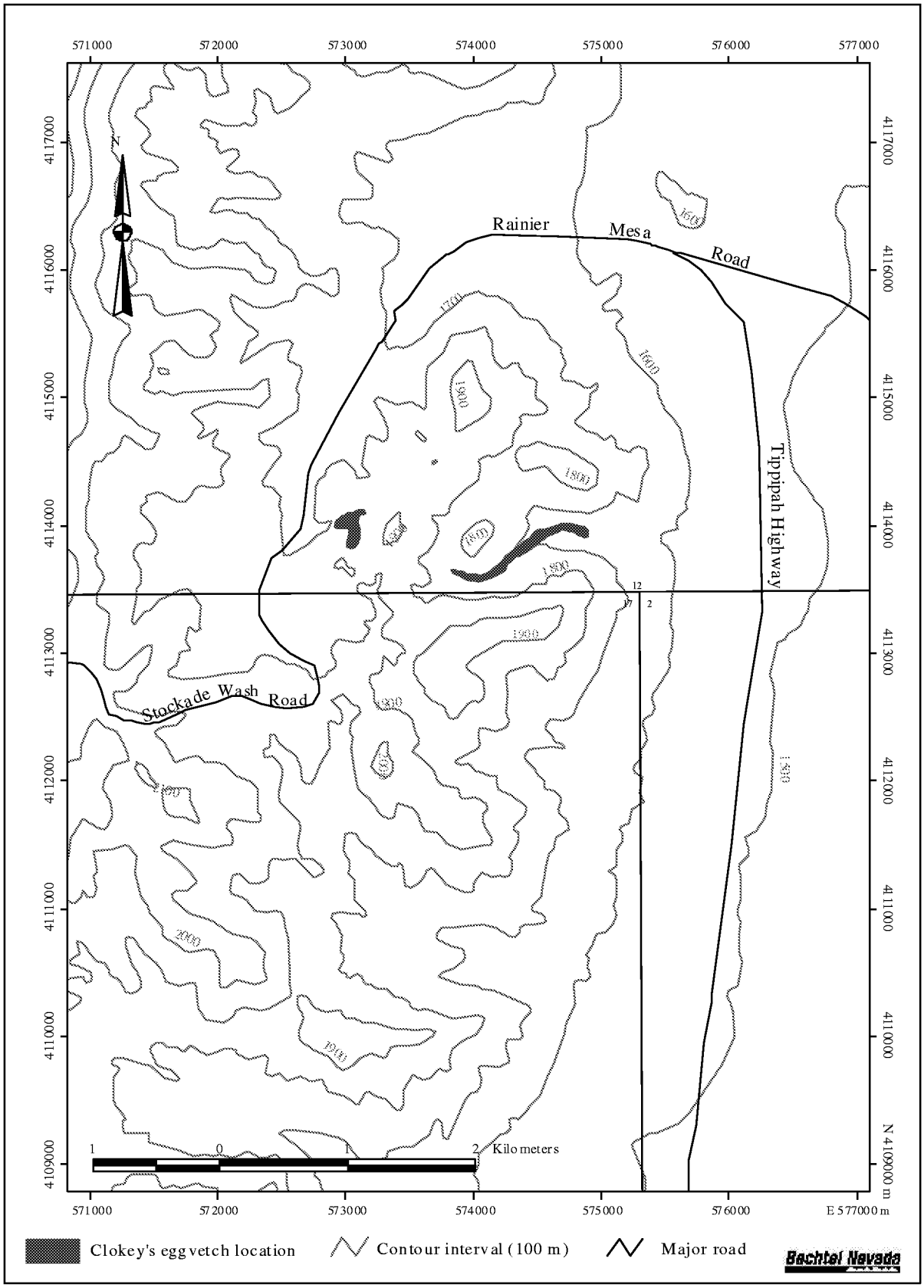

Figure III-4. Distribution of Clokey's eggvetch on the Eleana Range

Southern Belted Range

Figure III-5. Clokey's eggvetch in Kawich Canyon.

Habitat Description

Population: **Southern Belted Range**	Description: **Gritty Gulch, Lambs Canyon, Kawich Canyon**		
Elevation: **6100-6900**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Rocky, tuffaceous, sandy loam**
Disease: **None**	Aspect: **North, Northeast, West, Southeast, South, West**	Slope: **0-30**	# of Plants: **1,196+**
Topographic Position: **Bottom to upper slope**		Light: **Open, filtered partial**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)
Quercus gambelii (Gambel oak)

Shrubs
Artemisia nova (Black sagebrush)
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Cercocarpus ledifolius var. *ledifolius* (Curlleaf mountain mahogany)
Chrysothamnus viscidiflorus ssp. *puberulus* (Fuzzy green rabbitbrush)

Shrubs (continued)
Chrysothamnus viscidiflorus ssp. *viscidiflorus* (Sticky green rabbitbrush)
Ephedra viridis (Mormon tea)
Ericameria nauseosus ssp.*consimilis* var. *leiosperma* (Littleleaf rubber rabbitbrush)
Eriogonum microthecum var. *simpsonii* (Simpson's buckwheat)
Leptodactylon pungens (Granite pricklygilia)
Purshia stansburiana (Stansbury cliffrose)
Purshia tridentata (Antelope bitterbrush)
Ribes cereum var. *cereum* (Wax currant)
Symphoricarpos longiflorus (Desert snowberry)

Grasses

Achnatherum hymenoides (Indian ricegrass)
Achnatherum speciosa (Desert needlegrass)
Bromus tectorum (Cheatgrass)
Elymus elymoides ssp. *elymoides* (Bottlebrush squirreltail)
Koeleria macrantha (Prairie junegrass)
Poa fendleriana (Muttongrass)
Poa secunda (Sandberg's bluegrass)

Forbs

Arenaria congesta var. *subcongesta* (Subcongesta sandwort)
Astragalus calycosus var. *calycosus* (Torrey milkvetch)
Astragalus lentiginosus var. *micans* (Speckledpod milkvetch)
Calochortus flexuosus (Winding mariposa lily)
Castilleja linariaefolia (Wyoming Indian paintbrush)
Chenopodium incanum (Mealy goosefoot)
Cryptantha gracilis (Narrowstem catseye)
Cryptantha humilis (Roundspike catseye)
Descurainia pinnata ssp. *glabra* (Pinnate tansymustard)
Eriastrum eremicum (Desert woolystar)
Erigeron concinnus var. *concinnus* (Navajo fleabane)
Eriogonum caespitosum (Matted buckwheat)
Eriogonum esmeraldense var. *esmeraldense* (Esmeralda buckwheat)
Eriogonum racemosum (Redroot buckwheat)
Eriogonum ovalifolium var. *ovalifolium* (Cushion buckwheat)
Eriogonum umbellatum var. *dichrocephalum* (Cream sulpherflower buckwheat)
Gilia brecciarum ssp. *brecciarum* (Nevada gilia)
Heliomeris multiflora var. *nevadensis* (Nevada goldeneye)
Hesperostipa comata ssp. *comata* (Needle-and-thread)
Lesquerella kingii ssp. kingii (Kings bladderpod)
Lomatium nevadense var. *nevadense* (Nevada biscuitroot)
Lupinus argenteus ssp. *argenteus* var. *laxiflorus* (Spur lupine)
Penstemon floridus var. *austinii* (Austin's beardtongue)
Penstemon humilis ssp. *humilis* (Low beardtongue)
Penstemon pahutensis (Paiute beardtongue)
Phacelia saxicola (Stonecrop, scorpionweed)
Phacelia vallis-mortae var. *vallis-mortae* (Death Valley phacelia)
Phlox stansburyi (Colddesert phlox)
Senecio multilobatus (Lobeleaf groundsel)
Stephanomeria pauciflora (Brownplume wirelettuce)
Streptanthus cordatus var. *cordatus* (Heartleaf twistflower)

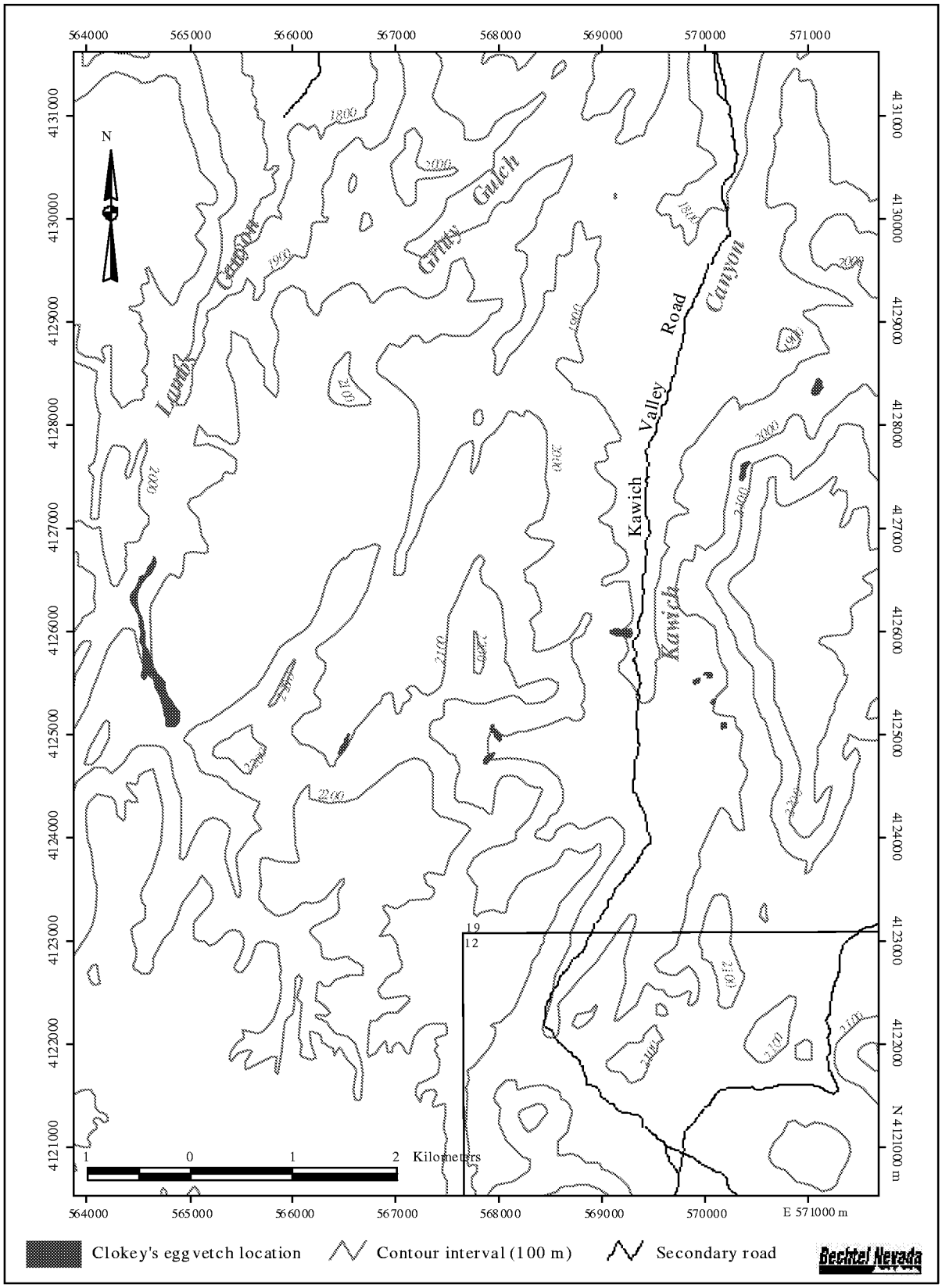

Figure III-6. Distribution of Clokey's eggvetch in the Southern Belted Range

Timber Mountain

Figure III-7. Clokey's eggvetch on north slope of South Peak of Timber Mountain.

Habitat Description

Population: **Timber Mountain**	Description: **North slope of south peak and south slope of north peak**		
Elevation: **6000-6600**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Sandy loam**
Disease: **None**	Aspect: **North, Northeast**	Slope: **0-30**	# of Plants: **400+**
Topographic Position: **Bottom to mid slope**		Light: **Filtered, Partial**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)

Shrubs
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Ephedra viridis (Mormon tea)
Leptodactylon pungens (Granite pricklygilia)
Tetradymia canescens (Spineless horsebrush)

Grasses
Achnatherum thurberiana (Thurber's needlegrass)
Elymus elymoides ssp. *elymoides* (Bottlebrush squirreltail)
Leymus cinereus (Basin wildrye)
Poa fendleriana (Muttongrass)
Poa secunda (Sandberg's bluegrass)

Forbs
Arenaria congesta var. *subcongesta* (Subcongesta sandwort)
Astragalus purshii var. *tinctus* (Wollypod milkvetch)
Castilleja applegatei (Wavyleaf Indian paintbrush)
Cryptantha gracilis (Narrowstem catseye)
Crepis occidentalis ssp. *occidentalis* (Largeflower hawksbeard)
Cryptantha virginensis Virgin River (Catseye)
Dichelostemma pulchellum (Bluedick)
Eriogonum caespitosum (Matted buckwheat)
Erigeron divergens (Spreading fleabane)
Eriogonum ovalifolium var. *ovalifolium* (Cushion buckwheat)
Eriogonum racemosum (Redroot buckwheat)
Lewisia rediviva var. *minor* (Oregon bitterroot)

Forbs (continued)
Lomatium nevadense var. *nevadense* (Nevada biscuitroot)
Mimulus suksdorfii (Suksdorf's monkeyflower)
Orobanche fasciculata (Clustered broomrape)
Penstemon floridus var. *austinii* (Austin's beardtongue)
Penstemon humilis ssp. *humilis* (Low beardtongue)
Phacelia fremontii (Fremont's phacelia)
Phlox gracilis ssp. *humilis* (Dwarf phlox)
Phlox stansburyi (Colddesert phlox)
Phacelia vallis-mortae var. *vallis-mortae* (Death Valley phacelia)
Streptanthus cordatus var. *cordatus* (Heartleaf twistflower)

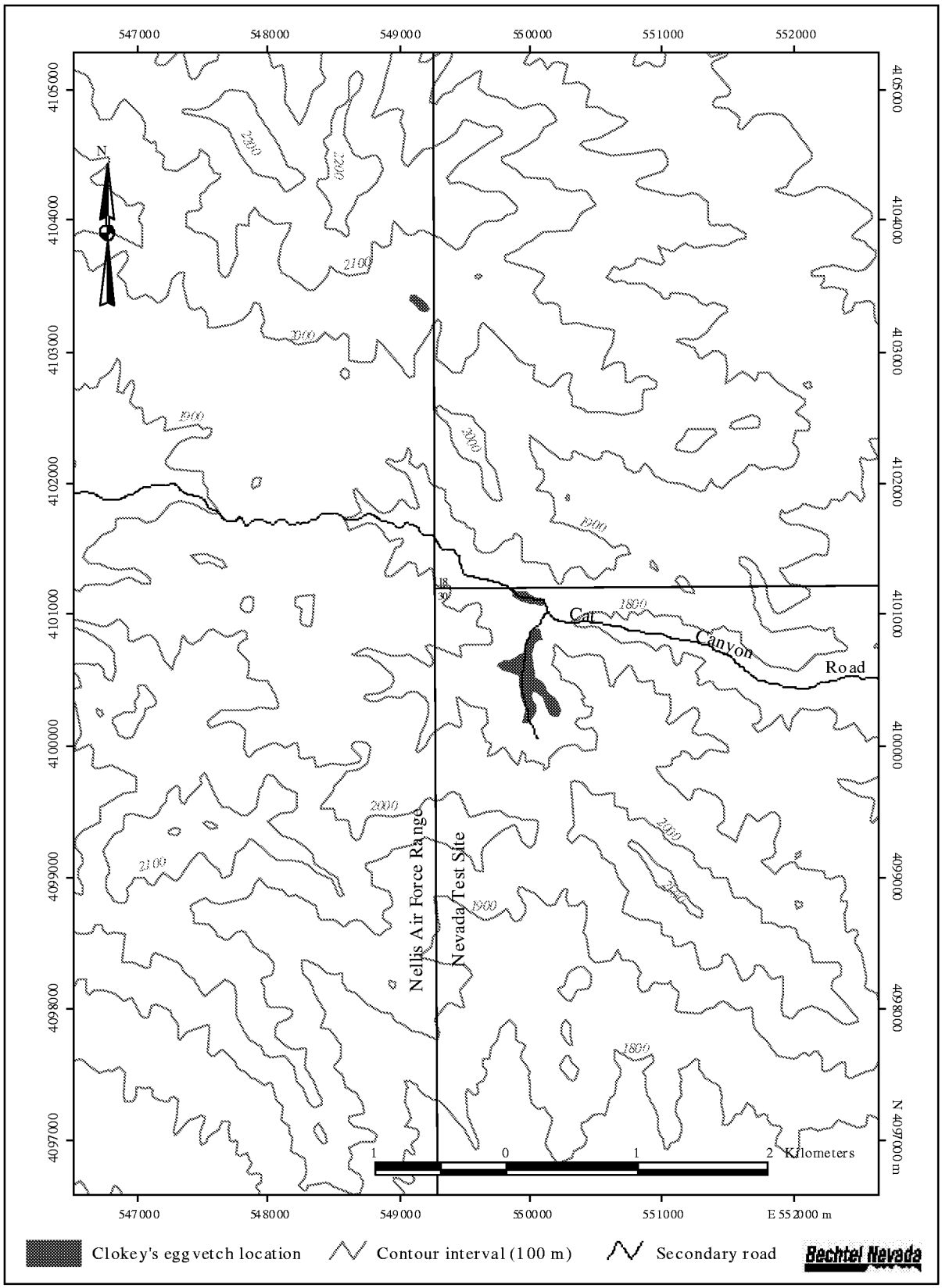

Figure III-8. Distribution of Clokey's eggvetch on Timber Mountain

Shoshone Mountains

Figure III-9. Clokey's eggvetch along old Shoshone Trail on north slope of Shoshone Mountains.

Habitat Description

Population: **Shoshone Mountain**	Description: **North slope along old Shoshone trail**		
Elevation**: 6200-6450**	Vegetation Association: **Gambel oak, Sagebrush**		Substrate: **Loam**
Disease: **None**	Aspect: **North**	Slope: **0-10**	# of Plants: **115+**
Topographic Position: **Bottom to lower slope**		Light: **Open**	

Associated Species

Trees
Amelanchier utahensis (Utah serviceberry)
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)
Quercus gambelii (Gambel oak)

Shrubs
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Ceanothus greggii ssp. *vestitus* (Mojave ceanthus)
Chrysothamnus viscidiflorus ssp. *puberulus* (Fuzzy green rabbitbrush)
Ephedra viridis (Mormon tea)
Eriogonum microthecum var. *simpsonii* (Simpson's buckwheat)
Purshia stansburiana (Stansbury cliffrose)
Tetradymia glabrata (Littleleaf horsebrush)

Grasses
Aristida purpurea (Purple threeawn)
Bromus tectorum (Cheatgrass)
Poa fendleriana (Muttongrass)
Poa secunda (Sandberg's bluegrass)

Forbs
Argemone corymbosa (Mojave prickly poppy)
Arabis pulchra var. *gracilis* (Desert rockcress)
Astragalus purshii var. *tinctus* (Woollypod milkvetch)
Castilleja applegatei (Wavyleaf Indian paintbrush)
Chaenactis douglasii (Douglas' dustymaiden)
Crepis occidentalis ssp. *occidentalis* (Largeflower hawksbeard)
Delphinium parishii ssp. *parishii* (Parish's larkspur)
Descurainia pinnata ssp. *glabra* (Pinnate tansymustard)
Dichelostemma pulchellum (Bluedick)
Eriogonum caespitosum (Matted buckwheat)

Forbs (continued)

Gilia brecciarum ssp. *brecciarum* (Nevada gilia)
Linanthus dichotomus (Eveningsnow)
Lomatium nevadense var. *nevadense* (Nevada biscuitroot)
Lupinus aridus (Desert lupine)
Machaeranthera canescens ssp. *canescens* (Hoary aster)
Mentzelia veatchiana (Whitestem blazingstar)
Mimulus suksdorfii (Suksdorf's monkeyflower)
Penstemon pahutensis (Paiute beardtongue)
Physaria chambersii (Chamber's twinpod)
Phacelia curvipes (Washoe scorpionweed)
Phacelia fremontii (Fremont's phacelia)
Phlox gracilis ssp. *humilis* (Dwarf phlox)
Phlox stansburyi (Colddesert phlox)
Sphaeralcea ambigua ssp. *ambigua* (Apricot globemallow)
Syntrichopappus fremontii (Yellowray fremontsgold)

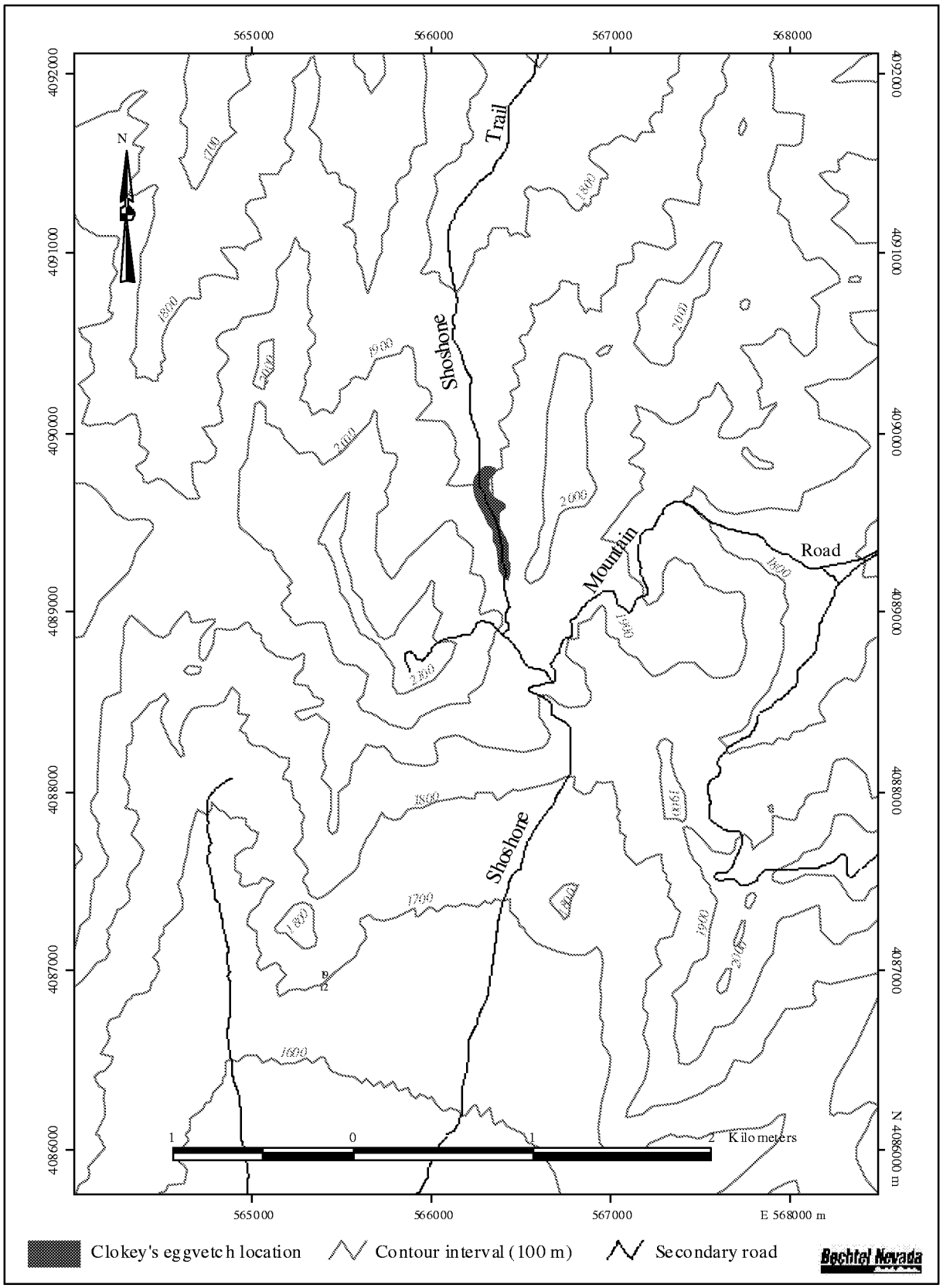

Figure III-10. Distribution of Clokey's eggvetch on Shoshone Mountain

Kawich Range

Figure III-11. Clokey's eggvetch at Cedar Pass Spring. Erosion from spring runoff along nonmaintained road.

Habitat Description

Population: **Kawich Range**	Description: **Cedar Pass Spring, east slope of Kawich range**		
Elevation: **6900-7020**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Gravelly, rocky**
Disease: **None**	Aspect: **Northeast, West**	Slope: **0-10**	# of Plants: **73**
Topographic Position: **Bottom to mid slope**		Light: **Open, partial**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)

Shrubs
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)

Forbs
Arenaria congesta var. *subcongesta* (Subcongesta sandwort)
Astragalus purshii var. *tinctus* (Woollypod milkvetch)
Eriogonum caespitosum (Matted buckwheat)
Lupinus aridus (Desert lupine)
Penstemon humilis ssp *humilis* (Low beardtongue)
Phlox stansburyi (Cold desert phlox)

Indian Springs, Belted Range

Figure III-12. Clokey's eggvetch at Indian Springs in the Belted Range.

Habitat Description

Population: **Belted Range**	Description: **Indian Springs Canyon**		
Elevation: **6350-6600**	Vegetation Association: **Pinyon/Juniper, Sagebrush**		Substrate: **Gravelly, Sandy loam**
Disease: **Ants**	Aspect: **Northeast, northwest**	Slope: **0-10**	# of Plants: **200**
Topographic Position: **Lower slopes**		Light: **Open, partial**	

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)
Quercus gambelii (Gambel oak)

Shrubs
Artemisia tridentata ssp. *tridentata* (Basin big sagebrush)
Ericameria nauseosus ssp. *nauseosus* var. *hololeuca* (Wooly rubber rabbitbrush)

Forbs
Penstemon palmeri (Palmer's penstemon)

Spring Mountains

Habitat Description

Population: **Spring Mountains**		Description: **Lee Canyon, Clark Canyon, Wheeler Pass, Wheeler Well, Willow Spring, Cold Creek**			
Elevation**:** **6200-8990**	Vegetation Association: **Ponderosa Pine, Oak, Pinyon/Juniper, Sagebrush**			Substrate: **Dolomite limestone derived soils, silt loams**	
Disease: **None**	Aspect: **Northwest, southwest**		Slope: **20-60%**	# of Plants: **1812**	
Topographic Position: **Rolling uplands, moderate relief**		Light: **Open to partial**			

Associated Species

Trees
Juniperus osteosperma (Utah juniper)
Pinus monophylla (Singleleaf pinyon)
Pinus ponderosa var. *scopulorum* (Ponderosa pine)

Shrubs
Artemisia tridentata ssp. t*ridentata* (Basin big sagebrush)
Gutierrezia sarothrae (Broom snakeweed)
Linanthus nuttallii ssp.*nuttallii* (Nutall's deserttrumpets)

Grasses
Elymus elymoides ssp. *elymoides* (Bottlebrush squirreltail)
Poa fendleriana (Muttongrass)

Forbs
Eriogonum umbellatum var. *subaridum* (Subarid sulpherflower buckwheat)
Hymenoxys cooperi var. *cooperi* (Cooper's hymenoxys)
Pedicularis semibarbata var. *charlestonensis* (Charleston pinewood lousewort)
Penstemon eatonii (Firecracker penstemon)

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