U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

Scientific Name:

Eriogonum diatomaceum

Common Name:

Churchill Narrows buckwheat

Lead region:

Region 8 (California/Nevada Region)

Information current as of:

04/15/2011

Status/Action

___ Funding provided for a proposed rule. Assessment not updated.

___ Species Assessment - determined species did not meet the definition of the endangered or threatened under the Act and, therefore, was not elevated to the Candidate status.

___ New Candidate

_X_ Continuing Candidate

___ Candidate Removal

___ Taxon is more abundant or widespread than previously believed or not subject

___ Taxon not subject to the degree of threats sufficient to warrant issuance of

___ Range is no longer a U.S. territory

___ Insufficient information exists on biological vulnerability and threats to s

___ Taxon mistakenly included in past notice of review

___ Taxon does not meet the definition of "species"

___ Taxon believed to be extinct

___ Conservation efforts have removed or reduced threats

Petition Information

_X_ Non-Petitioned

___ Petitioned

90-Day Positive:

12 Month Positive:

Did the Petition request a reclassification?

For Petitioned Candidate species:

Is the listing warranted(if yes, see summary threats below)

To Date, has publication of the proposal to list been precluded by other higher priority listing?

Explanation of why precluded:

Historical States/Territories/Countries of Occurrence:

- **States/US Territories**: Nevada
- **US Counties**:County information not available
- **Countries**:Country information not available

Current States/Counties/Territories/Countries of Occurrence:

- **States/US Territories**: Nevada
- **US Counties**: Lyon, NV
- **Countries**: United States

Land Ownership:

All occurrences of *Eriogonum diatomaceum* are located on public lands managed by the Bureau of Land Management (BLM), Carson City District Office.

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Biological Information

Species Description:

Eriogonum diatomaceum Reveal, J. Reynolds & Picciani (Churchill Narrows buckwheat) is a low, matted, herbaceous perennial (Figure 1) that is only known from the Churchill Narrows area in the Pine Nut Mountains in Lyon County, Nevada. The species grows from a branched, woody caudex with densely gray-tomentose leaves sheathing up the stem. The leaves are elliptic and densely tomentose on both surfaces. The flowering stems are scapose with white tomentose. The inflorescence is capitate with congested, turbinate involucres. The flowers are creamy-white with greenish-tan to reddish midribs (Reveal et al. 2002, pp. 87-88).

Taxonomy:

This species was discovered in 1997 during surveys conducted for a proposed mining project and was described by Reveal et al. (2002, pp. 87-89). *Eriogonum diatomaceum* is similar in appearance to a species known from the Great Plains, *Eriogonum pauciflorum Pursh* (fewflower buckwheat), but is allied to species of the *Eriogonum ochrocephalum* S. Watson (whitewoolly buckwheat) complex, characterized as matted perennials with scapose stems and capitate inflorescences, and specifically those that have a rigid, usually turbinate involucre (Reveal *et al*. 2002, p. 89). This species is currently considered a narrow endemic of the Lahontan Basin section of the western Great Basin, an area of broad, irregularly shaped valleys interspersed among low mountain ranges of relatively short length, with a mean annual precipitation of about 4.5 inches (in) (11.4 centimeters (cm)) (Holmgren 1972, p. 87). *Eriogonum* is comprised of about 250 species (Reveal 2005, p. 76). Within the genus, *E. diatomaceum* is placed within the subgenus Eucycla, a complex group with many narrow endemics throughout the interior western United States, many of which specialize on volcanic ash, clay and or calcareous habitats (Morefield 1996, p. 10). We have carefully reviewed the available taxonomic information to reach the conclusion *E. diatomaceum* is a valid taxon.

Figure 1. *Eriogonum diatomaceum*. U.S. Department of Interior

Habitat/Life History:

Eriogonum diatomaceum is restricted to chalky, diatomaceous outcrops between 4,300 and 4,560 feet (ft) (1,311 and 1,390 meters (m)) elevation in the Churchill Narrows located in the Pine Nut Mountains of western Nevada (Reveal *et al.* 2002, p. 88). At its type locality, *E. diatomaceum* is found on diatomaceous soils developed from the Coal Valley Formation on dry, barren exposed knolls and drainages on all aspects; the exposed diatomaceous soils are generally white to yellowish in color, with variable volcanic cobble-rock cover (Reveal *et al.* 2002, pp. 88-89). The major components of the outcrops at the type locality are fossil diatoms (amorphous silica), calcium montmorillonite, feldspar, and gypsum (Reveal *et al*. 2002, pp. 88-89). Gypsum crystalline formations are also frequently associated with these soils, which are generally shallow and well drained; permeability is moderately slow and available water capacity is very low (Reynolds 2001,

p. 8). A slight increase in plant size and density was noted where moisture accumulates within the drainages; however, on the knolls and ridgelines, the species is entirely dependent on precipitation and moisture retained in the soil (Reynolds 2001, p. 8).

Species associated with *Eriogonum diatomaceum* include *Atriplex confertifolia* (Torr. & Frém.) S. Watson (shadscale), *Stanleya pinnata* var. *pinnata* (Pursh) Britton (princes plume), *Sarcobatus baileyi* Coville (Bailey's greasewood), and *Picrothamnus desertorum* Nutt. (bud-sage) (Reveal *et al.* 2002, p. 88). *Eriogonum diatomaceum* is generally found on sparsely vegetated sites where competition with other species for light and moisture is minimal or absent. This species has not been found in any other habitat or soil type (Reynolds 2001, Table 4, Appendix 1, p. 6).

Eriogonum diatomaceum breaks dormancy in early spring and can flower as early as April or May, depending on timing of changes in temperature and precipitation events. Plants were observed in full flower in the second week of June for two consecutive years and continued to flower into September; fruits probably mature within a month of flowering, between the end of June and mid-November (Reynolds 2001, p. 100; BLM 2006, p. 11). Older mature plants comprise roughly 77 percent of the living individuals with 5 percent of the total individuals being seedlings, a size class distribution that appears typical for long-lived perennials in an arid environment (BLM 2006, p. 11). No studies have been conducted on the reproductive biology of *E. diatomaceum*, but most species of *Eriogonum* are thought to rely on insect-mediated pollen exchange (Morefield 1996, p. 23); a variety of flying insects were observed in the field as potential pollinators and were collected for identification (Reynolds 2001, p. 2).

Historical Range/Distribution:

Eriogonum diatomaceum is known from one location (Figure 2). The type locality at Churchill Narrows comprises a single population with 15 discrete occurrences (Reynolds 2001, p. 6). The occurrences occupy a total area of approximately 97 acres (ac) (39.3 hectares (ha)) (Reynolds 2001, Table 1, Appendix 1, p. 1). These occurrences are all on lands managed by the BLM. All but one of these occurrences are small, ranging from 1.5 to 12 ac (0.6 to 4.9 ha), with the other occurrence covering about 40 ac (16 ha) (Reynolds 2001, Table 1, Appendix 1, p. 1). Over 5,000 ac (2,023 ha) of potentially suitable habitat have been surveyed for this species in the Lyon County portions of the Pine Nut Mountains, Virginia Range, and Desert Mountains (Reynolds 2001, p. 7).

Current Range Distribution:

Eriogonum diatomaceum was only recently described and its current range is the same as described above under Historical Range/Distribution.

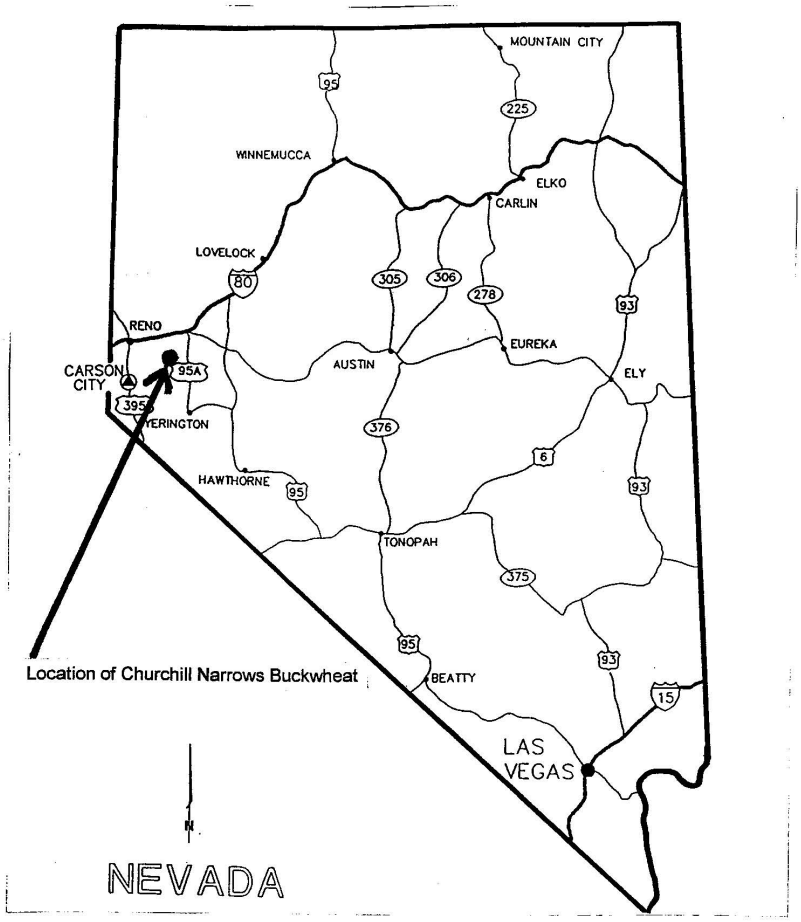

Figure 1. Known Population Area of Churchill Narrows Buckwheat

Appendix 2, page 1

Figure 2. *Eriogonum diatomaceum* location map from Reynolds (2001, Appendix 2, p. 1).

Population Estimates/Status:

Eriogonum diatomaceum is known from only a single population with 15 distinct occurrences (Reynolds 2001, p. 6). The total number of individuals was estimated at 47,251 based on a 1997 mining project review and a 1998-1999 range wide status survey (Reynolds 2001, Table 1, Appendix 1, p. 1). The total number of individuals was estimated by performing direct counts of individuals within the boundaries of each of the smallest occurrences. For the larger occurrence, average densities were calculated within quadrats and extrapolated to obtain a total based on the entire area of the occurrence (Reynolds 2001, p. 6). Permanent monitoring plots have been installed and several years of data have been collected (Tonenna 2007); however, these BLM monitoring data have not been provided to the Service.

Threats

A. The present or threatened destruction, modification, or curtailment of its habitat or range:

Mineral exploration and mine development for diatomaceous soils is the most significant threat to *Eriogonum diatomaceum* and its habitat (Reynolds 2001, p. 11). In addition to mineral exploration and development, potential threats are posed to *Eriogonum diatomaceum* from trampling by livestock, road construction and maintenance, off-highway vehicle (OHV) use, and invasive species.

Mineral Exploration and Development

Diatomite is an economically valuable mineral with many commercial and industrial uses (Reynolds 2001, p. 6). Diatomite production in the United States accounts for 32 percent of total world production and the demand for this material is increasing as more applications for its use are developed. Observations in 2003 confirmed that direct and indirect impacts to *Eriogonum diatomaceum* from mining activities have taken place in the recent past and are expected to increase in the future (BLM 2003, p. 6; Service 2003, p. 1). In the Churchill Narrows area, the habitat within 11 of the 15 occurrences of *E. diatomaceum* has been proposed for exploration and potential development of existing mining claims, and past mining operations have occurred within another, the largest known occurrence (Reynolds 2001, p. 11). Mineral exploration permitted by the BLM in the late 1990's (BLM 1999, p. 17) resulted in the loss of an estimated 530 plants; the exploration site was recontoured and seeded but nothing had grown on the site at the time of the last report in our files (BLM 2003, p. 6).

The site was then identified in a Notice of Operations submitted to the BLM on January 13, 2003, for mining of 600-700 tons (546-637 metric tons) of material from four mining claims for field tests as a soil amendment and from 100 to 200 tons (91 to 182 metric tons) of material for test work as an industrial absorbent (W.R. Byrd Minerals, Inc. 2003a, p. 2). Under this initial Notice of Operations, about 1.13 ac (0.5 ha) would be disturbed within habitat of the largest occurrence of *Eriogonum diatomaceum* to accommodate removal of the material and the construction of an access road (W.R. Byrd Minerals, Inc. 2003a, pp. 1-2). A second Notice of Operations was submitted to the BLM on November 14, 2003, for removal of 50,000 tons (45,500 metric tons) of material from two adjacent mining claims with an additional surface disturbance of 4.9 ac (1.2 ha) (W.R. Byrd Minerals, Inc. 2003b, p. 6). Both Notice of Operations applications have since been withdrawn (Erbes 2008). Nevertheless, the claimant retains valid existing rights, and mining activity could be proposed in the future (BLM 2008a, pp. 4-50).

A recent review of existing mining claims with habitat for the species found that while many mining claims have been dropped, two remain active (BLM, Land and Mineral Legacy Rehost 2000 System - LR2000, 2011). Mining of the two active claims, which are on adjacent diatomaceous earth outcrops, has recently been discussed with the Carson City BLM and will most likely be pursued (Tonenna 2011a). Further losses of habitat and individuals from mining activities and associated road development and maintenance may ultimately impact long-term viability and lead to extirpation of the species.

Livestock Grazing

Livestock grazing in three contiguous BLM allotments (Clifton Flats, Fort Churchill, and Adriance Valley) on public lands is the dominant land use throughout the known range of *Eriogonum diatomaceum*. Trampling of individual plants and soil disturbance caused by livestock has been observed throughout the area and in 65 percent of the occurrence areas (Reynolds 2001, p. 12). The largest occurrence of this species occurs on the Adriance Valley Allotment that is permitted for year-round use. An Environmental Assessment (EA) was prepared by the BLM in 2006 to analyze the impacts resulting from the renewal of the Term Grazing Permit for the Adriance Valley Allotment which includes 31,790 ac (12,865 ha) of public land (BLM 2006, p. 5). The proposed action was to modify the year-round operation (1,620 animal unit months (AUMs)) to one with emphasis on fall/winter/early spring grazing, with 184 cattle (1,282 AUMs) from September 1 to March 31 and 67 cattle (337 AUMs) from April 1 to August 31 (BLM 2006, p. 3). The EA concluded that fewer livestock would be present during the growth period of *E. diatomaceum* and because livestock do not excessively use the sparsely vegetated areas characteristic of the plant species' habitat, the area would continue to meet the Standards and Guidelines for Sensitive Species Habitat (BLM 2006, p. 13), and there

would be no significant adverse impacts (BLM 2006, p. 19). This new grazing system was implemented in 2006. The EA also notes that trampling by wild horses would be a concern if their numbers were to increase (BLM 2006, p. 13). Although the EA stated that stems and leaves of *E. diatomaceum* can be broken and soils can become compacted by as much as 3.9-5.9 in (10-15 cm) by trampling (BLM 2006, p. 11), we have no information in our files that would allow us to assess the significance of trampling and associated soil disturbance by livestock or wild horses on *E. diatomaceum*.

Road Development and OHV Activity

Road development or OHV activity has been noted as a threat to four *Eriogonum diatomaceum* occurrences (Reynolds 2001, Table 1, Appendix 1, p. 1). Major dirt roads have been constructed to provide access to the mining claims, and a vehicle testing operation has a permit to test vehicles on some of the gravel roads in the vicinity of *E. diatomaceum* occurrences (BLM 2003, p. 5). An annual organized OHV event occurs within 1 mi (1.6 km) of several occurrences (Reynolds 2001, p. 12). There also has been increased general OHV activity in the Churchill Narrows area (Tonenna 2007, 2011b), but the magnitude of this threat to individual *E. diatomaceum* occurrences is unknown.

Invasive Species

Invasive annual weeds, including *Bromus tectorum* L. (cheatgrass) and *Descurainia pinnata* (Walter) Britton (tansy mustard), are present with very low cover in several *Eriogonum diatomaceum* occurrences (Reynolds 2001, Table 1, Appendix 1, p. 1), but are not considered to be a direct competitive threat, presumably because the species' specialized habitat is not conducive to their spread. They may, however, pose an indirect threat by contributing to the flammability of the surrounding vegetation and increasing the likelihood and frequency of wildfires and the need for fire suppression (Reynolds 2001, p. 12). Moreover, these weed observations were made in 1998 and 1999, years of low precipitation and dry conditions. Precipitation was greater and conditions were wetter in 2005 and 2006. The BLM (2006, p. 11) indicated that noxious weeds were not present in any of their 2005-2006 monitoring plots and that cheatgrass was a very small component of the habitat. At this time, we do not believe that invasive weeds comprise a significant threat to the species or its habitat.

Summary of Factor A

Mining of the economically valuable diatomaceous deposits that provide habitat for *Eriogonum diatomaceum* is the most significant potential threat to the species. A mining Notice of Operations application, which would have impacted the largest occurrence of *E. diatomaceum*, has been withdrawn, but initiating mining of the two active claims has recently been discussed. Impacts from trampling by livestock, wild horses, and OHVs are a potential threat to most occurrences, especially the smaller ones which are more susceptible to extirpation. Invasive weeds make up a small component of *E. diatomaceum* habitat and are not a significant threat to the species. Based on our evaluation of existing mining claims and potential claim development, livestock trampling, road development and OHV activity, we conclude that there is sufficient information to develop a proposed listing rule for this species due to the present and threatened destruction, modification, or curtailment of its habitat and range.

B. Overutilization for commercial, recreational, scientific, or educational purposes:

There are no known threats to *Eriogonum diatomaceum* from overutilization.

C. Disease or predation:

Disease

A rust (fungal) pathogen was observed on approximately 26 percent of the overall population within the 15 occurrences at Churchill Narrows. The number of individuals noticeably infected by the rust varied greatly within each occurrence. The identity of this pathogen, its origin, and the potential impact on this species are currently unknown (Reynolds 2001, p. 11). Consequently, we are unable to assess the significance of this threat to the viability of *Eriogonum diatomaceum*.

Herbivory

The clipping and consumption of *Eriogonum diatomaceum* flower stalks (BLM 2003, p. 5; Longland *et al*. 2009, p. 26) and the tunneling of an unknown rodent into *E. diatomaceum* roots (Tonenna 2011b) has been observed by the BLM. In the summer of 2007, Longland *et al.* (2009, pp. 26-30) initiated a study to determine what animal(s) remove *E. diatomaceum* flower stalks. From July to October 2007, researchers visited two of the *E. diatomaceum* occurrences. Tracking stations that extended 0.5 m (1.6 ft) around individual *E. diatomaceum* plants revealed rabbit tracks directed directly towards *E. diatomaceum* (Longland *et al*. 2009, p. 27). Rabbit pellet counts revealed that rabbit activity was significantly focused on *E. diatomaceum* rather than other nearest neighbor plant species (P less than 0.05; Longland *et al*. 2009, p. 28). Camera traps captured photos of blacktail jackrabbits (*Lepus californicus*) with their heads conspicuously placed in the flower stalks of *E. diatomaceum* (Longland *et al*. 2009, p. 28). Finally, flower removal was monitored on plants with developing flowers and on others that already had mature flowers. Developing flowers were clipped and mature flowers were not removed, thus further supporting rabbit herbivory (i.e., flower eating) and not rodent granivory (i.e., seed eating) (Longland *et al*. 2009, p. 28).

Rabbit herbivory is a natural component of the Churchill Narrows area, and *Eriogonum diatomaceum* has evolved in the presence of rabbits. Herbivory does not pose a short-term threat to *E. diatomaceum* because individual plants are long-lived, but the significance of any threat posed by blacktail jackrabbits to its persistence over the long-term is poorly understood. The significance of herbivory as a stressor depends not only on its frequency and intensity, but whether it interferes with seedling recruitment, which is a question that remains unanswered. Photos of grey foxes (*Urocyon cinereoargenteus*) were also captured by the camera traps, suggesting that predation on blacktail jackrabbits is actively occurring and may aid in managing flower clipping and consumption (Longland *et al*. 2009, pp. 28-29). Further studies would need to be done to determine if management to reduce jackrabbit herbivory is necessary to maintain *E. diatomaceum* occurrences.

D. The inadequacy of existing regulatory mechanisms:

National Environmental Policy Act (NEPA)

The NEPA (42 U.S.C. 4371 *et seq*.) requires Federal agencies to describe a proposed action, consider alternatives, identify and disclose potential environmental impacts of each alternative, and involve the public in the decision making process. The release of documents is for disclosure, and NEPA does not require or guide mitigation for project impacts. Projects that are covered by certain “categorical exclusions” are exempt from NEPA biological evaluations. The BLM complies with NEPA for actions requiring an environmental assessment, including many projects in or near *Eriogonum diatomaceum* habitat. Federal agencies are not required to select the NEPA alternative having the least significant environmental impacts. A Federal agency may select an action that will adversely affect sensitive species provided that these effects were known and identified in a NEPA document.

Federal Land Policy Management Act (FLPMA)

The BLM is required to incorporate Federal, State, and local input into their management decisions through Federal law. The FLPMA (Public Law 94-579, 43 U.S.C. 1701) was written “to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development and

enhancement of the public lands; and for other purposes." Section 102(f) of the FLPMA states that "the Secretary [of the Interior] shall allow an opportunity for public involvement and by regulation shall establish procedures … to give Federal, State, and local governments and the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands." Therefore, through management plans, the BLM is responsible for including input from Federal, State, and local governments and the public. Additionally, Section 102(c) of the FLPMA states that the Secretary shall "give priority to the designation and protection of areas of critical environmental concern" in the development of plans for public lands. Although the BLM has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the BLM also has the ability under the FLPMA to establish and implement special management areas such as Areas of Critical Environmental Concern, wilderness, research areas, etc., that can reduce or eliminate actions that adversely affect species of concern (including listed species).

BLM Manual 6840

All of the known *Eriogonum diatomaceum* occurrences are on public lands managed by the BLM. As a candidate species, it is managed under the policies contained in their 6840 Manual, Release 6-125, revised as of December 12, 2008 (BLM 2008b). BLM policy is to manage candidate species as sensitive species, defined as "species that require special management or considerations to avoid potential future listing" (BLM 2008b, Glossary, p. 5). The stated objective for sensitive species is to initiate proactive conservation measures that reduce or eliminate threats to minimize the likelihood of and need for listing (BLM 2008b, Section 6840.02). Conservation, as it applies to BLM sensitive species, is defined as "the use of programs, plans, and management practices to reduce or eliminate threats affecting the status of the species, or improve the condition of the species' habitat on BLM-administered lands" (BLM 2008b, Glossary, p. 2).

Mining Law of 1872

Mineral entry is authorized by the Mining Law of 1872 (Mining Law), as amended (17 Stat. 91; 30 U.S.C. 22-54). The Mining Law and its amendments govern the exploration for and extraction of locatable minerals by claimants on public land. The Mining Law guides the Mining Law Administration program managed by the BLM which primarily involves the recordation of mining claims and sites, maintenance (annual work-surface management) of mining claims and sites, and mineral patents (43 CFR 3812). Federal mineral estate falls into one of three categories: locatable, leasable, and salable minerals. Preparing a list of locatable minerals is difficult because the history of the law has resulted in a definition of minerals that includes economics. Any mineral may become locatable if it meets the definition of "valuable mineral deposit" under the Mining Law and the definition of "locatable mineral" (43 CFR 3812.1). In Nevada, the BLM considers diatomaceous earth to be a locatable mineral (BLM 2007, p. 1).

Federal regulations that apply to locatable mineral entry activities impose reasonable control to prevent undue or unnecessary degradation, but not to prevent, or unduly hinder, mineral entry activities (43 CFR 3809). Federal surface management regulations recognize three levels of operation with increasing requirements. These levels of operation and their requirements are: (1) Casual use by operator who does negligible disturbance and does not use mechanized earth-moving equipment (43 CFR 3809.1-2). No notice or plan is required and the operator does not need to contact the administering agency before proceeding with mineral entry activities; (2) Surface alteration of 5 ac (1.67 ha) or fewer during any calendar year (43 CFR 3809.1-2). A written notice must be submitted to the administering agency 15 days prior to starting operations; this notice must describe the operation, location, and access, and must contain a statement that the lands will be reclaimed to standards specified in the regulations, but no notice of approval is required before proceeding; and (3) Surface disturbance of more than 5 ac (1.67 ha), or if operations are proposed in designated Wild and Scenic River Areas, Areas of Critical Environmental Concern (ACECs), or OHV closed areas (43 CFR 3809.1-3). A plan of operation must be submitted to the administering agency describing the entire operation, equipment to be used, location of access, support facilities, drill sites, measures to prevent undue degradation, and a reclamation plan. The administering agency must approve the plan before the

operation may proceed.
Earlier mining operations and recent proposals have followed the last process with plans of operation filed with the Carson City District Office of the BLM. The 1999 proposal was evaluated in an EA (BLM 1999). Although the decision record for the 1999 EA stipulated that all populations of all buckwheat species (*Eriogonum diatomaceum* had not been formally described at the time) were to be avoided and areas to be avoided were to be identified with flagging or fencing, an estimated 530 plants may have been lost without mitigation being required (BLM 2003, p. 6). Two mining claims within habitat for this species remain active (BLM, Land and Mineral Legacy Rehost 2000 System - LR2000, 2011). Mining of the two active claims has recently been discussed with the Carson City BLM and will most likely be pursued (Tonenna 2011a).

State

Eriogonum diatomaceum has been declared by the NDF to be threatened with extinction pursuant to Nevada Revised Statutes (N.R.S.) 527.260-.300, and was added to the state list of fully protected species of native flora (Nevada Administrative Code 527.010) in 2004. Removing or destroying plants on the State's fully protected list is prohibited except under special permit issued by NDF (N.R.S. 527.270). The adequacy of this law, however, depends on informed and cooperative land managers, or in some form of deterrent enforcement, for either of which the current law does not provide. It also depends on the State Forester Firewarden's discretion in issuing or withholding permits, and it placing protective conditions on permits that are issued. Nevada law does not mandate the continued survival of any plant species which it declares to be in danger of extinction.

E. Other natural or manmade factors affecting its continued existence:

Stochastic Events

Small populations like *Eriogonum diatomaceum* have a higher risk of extinction due to demographic and environmental uncertainty and natural catastrophes (Shaffer 1987, pp. 69-75; Lande 1993, pp. 911-927). *Eriogonum diatomaceum* is known only from one location in an area of approximately 97 ac (30 ha) (Reynolds 2001, Table 1, Appendix 1, p. 1). Drought and wildfire are the most likely stochastic events that could adversely affect *E. diatomaceum*, as this species is dependent on precipitation and moisture retained in the soil and susceptible to being destroyed by a single, large fire.

Climate Change

Current climatic models are predicting warmer air temperatures due to elevated levels of atmospheric carbon dioxide and increased drought and flood frequency (Intergovernmental Panel on Climate Change (IPCC) 2007, pp. 2-3). Other effects of climate change include, but are not limited to, changes in types of precipitation (Knowles *et al*. 2006, p. 4557), earlier spring run-off (Stewart *et al*. 2005, p. 1152), longer and more intense fire seasons (Chambers and Pellant 2008, pp. 31-32), increases in exotic species invasions (Hawkins *et al*. 2008, p. 37; Bradley *et al*. 2010, pp. 310-318), and more frequent extreme weather events (IPCC 2007, p. 13). Increasing temperatures and drought frequency could adversely affect *Eriogonum diatomaceum* by causing physiological stress, altering phenology, reducing recruitment events and seedling establishment, and altering fire frequencies. At this time, it is difficult to predict local climate change impacts to *Eriogonum diatomaceum*; thus, while the information indicates that climate change has the potential to affect its ecosystem in the long-term, there is much uncertainty regarding the attributes that could be affected and their timing, magnitude, and rate of change.

Conservation Measures Planned or Implemented :

Currently, no conservation strategies or agreements exist for *Eriogonum diatomaceum*, but an ACEC

nomination to protect the occupied and potential habitat for *Eriogonum diatomaceum* on about 5,900 ac (2,388 ha) has been prepared (BLM 2003, p. 7) and signed by the BLM (Tonenna 2004). The proposed ACEC includes all 15 known occurrences of *E. diatomaceum* and adjacent diatomaceous earth outcrops to allow for expansion of the plant's limited population into the surrounding suitable habitat (BLM 2008a, pp. 2-17). The proposed management actions for the ACEC include: pursuing a mineral withdrawal for the ACEC; limiting OHV travel in the ACEC to designated roads and trails; authorizing no new surface-disturbing activities, subject to existing valid rights; and considering acquisition of non-Federal lands in the vicinity of the ACEC identified as sites that have similar or potential habitat or have occurrences of the plant (BLM 2008a, pp. 2-17). While the area within the ACEC would be withdrawn from mineral resource exploration, development, and extraction by new claimants, mineral withdrawals are subject to valid existing rights of the mining claimant. Therefore, these types of activities could occur despite the mineral withdrawal (BLM 2008c, pp. 4-50).

The ACEC nomination was originally incorporated into an amendment to the Pine Nut Mountain Land Use Plan (BLM 2008b, pp. 2-17), but the BLM has tabled the plan amendment until 2012 pending the availability of funds (BLM 2010, p. 1). The BLM is anticipating the start of a District-wide Resource Management Plan (RMP) amendment process, which would cover all lands administered by the Carson City District and be a more comprehensive document than the amendment to the Pine Nut Mountain Land Use Plan (BLM 2010, p. 1). Pending funding, the District-wide RMP amendment would override the amendment to the Pine Nut Mountain Land Use Plan. The District-wide RMP would include prospective management decisions on travel management, recreation, land tenure, ACECs, special status species management, and other resource concerns, which would address *Eriogonum diatomaceum* and the ACEC nomination (BLM 2010, p. 1).

Summary of Threats :

Eriogonum diatomaceum is a highly localized endemic restricted to a specific mineral substrate of economic value. The most significant threat is development of this mineral resource. Potential threats to the species include trampling by domestic livestock and wild horses, damage from OHVs, a rust disease, herbivory, and the potential for an increase in non-native weeds to alter fire frequency and intensity in its habitat. We have no data on which to assess the significance of these potential secondary threats. We find that *E. diatomaceum* is warranted for listing throughout all its range and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

_____ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions(PECE)?

Recommended Conservation Measures :

• If the owner of the mineral rights can be persuaded to voluntarily relinquish his rights, all lands supporting the species should be withdrawn from mineral entry when the ACEC is established.
• The BLM should continue monitoring the population and provide an analysis of the population data. Further studies should be done to see if jackrabbit herbivory is limiting seedling recruitment and establishment.

Priority Table

Magnitude	Immediacy	Taxonmomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/Population	3
	Non-imminent	Monotypic genus	4
		Species	**5**
		Subspecies/Population	6
Moderate to Low	Imminent	Monotype genus	7
		Species	8
		Subspecies/Population	9
	Non-Imminent	Monotype genus	10
		Species	11
		Subspecies/Population	12

Rationale for Change in Listing Priority Number:

Magnitude:

Direct and indirect impacts to *Eriogonum diatomaceum* from mining activities have taken place in the recent past and are expected to increase in the future. The demand for production of high quality diatomite is increasing as more applications for its use are developed. Threats to the species and its habitat occur rangewide, occurrences are small and no enforceable regulatory mechanisms are in place to protect this species throughout its range. The economic value of the mineral deposits on which the species depends produces a threat of high magnitude. The diatomite deposits may be determined to be locatable under the Mining Law of 1872, in which case staking for patenting of mining claims would be possible. The magnitude of threats from trampling by livestock, OHVs, and herbivory are not quantifiable at present because of lack of data but are not believed to be significant.

Imminence :

Threats to *Eriogonum diatomaceum* from mining are no longer considered imminent. A Notice of Operation for the exploration and development of a mining claim within the largest occurrence of the species previously filed with the BLM has been withdrawn. Mining of two active claims on adjacent diatomaceous earth outcrops has recently been discussed with the BLM and most likely will be pursued. Loss of potential diatomaceous earth outcrops to allow for expansion of the plant's limited population is not imminent at this time because potential mining plans are not yet concrete. The effects of livestock grazing, OHV activities, and herbivory remain unknown. Although livestock grazing in the allotments where the species occurs happens year around, the spring livestock numbers have been reduced in the Adriance Valley Allotment where the largest occurrence of *E. diatomaceum* occurs. Impacts from trampling, OHV activities, and herbivory are likely localized and cumulative over time, and therefore, do not constitute an imminent threat to the persistence of the species.

__Yes__ Have you promptly reviewed all of the information received regarding the species for the purpose of determination whether emergency listing is needed?

Emergency Listing Review

__No__ Is Emergency Listing Warranted?

The BLM is actively working to gain more protection for *Eriogonum diatomaceum* and its habitat through designation of an ACEC in the Churchill Narrows. Although mining claims exist throughout much of the species' habitat, there is no current proposal to initiate mining activity in habitat currently supporting the plant. Should mining be proposed in its current range, the Service will reevaluate the need to emergency list the species.

Description of Monitoring:

In 2004, the BLM received funding to develop a monitoring protocol, and permanent plots were installed in 2005 to monitor the status of the species. Several years of data have been collected (Tonenna 2007), but these data have not been provided to the Service.

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:

none

Indicate which State(s) did not provide any information or comment:

Nevada

State Coordination:

The State of Nevada does not include plants in its State Wildlife Action Plan.

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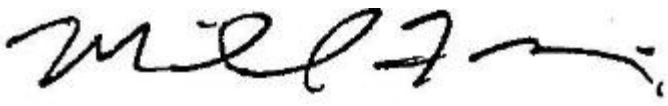
Approval/Concurrence:

Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:  05/31/2011
Date

Concur: _____ _____
Date

Did not concur: _____ _____
Date

Director's Remarks: