Eriogonum pelinophilum
(clay-loving wild buckwheat)

5-Year Review:
Summary and Evaluation

Photo taken by and used with permission of Dr. James Reveal

U.S. Fish and Wildlife Service
Western Colorado Ecological Services Office
Grand Junction, Colorado

September 2009

5-YEAR REVIEW

Species reviewed: *Eriogonum pelinophilum* (clay-loving wild buckwheat)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

5-YEAR REVIEW
Eriogonum pelinophilum (clay-loving wild buckwheat)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Mountain-Prairie Regional Office
Michael Thabault, Assistant Regional Director - Ecological Services, 303/236-4210
Bridget Fahey, Regional Endangered Species Chief, 303/236-4258
Seth Willey, Regional Recovery Coordinator, 303/236-4257

Lead Field Office: Western Colorado Ecological Services Field Office
Susan Linner, Project Leader for the Colorado Field Office, 303/236-4774
Patty Schrader Gelatt, Acting Western Colorado Supervisor, 970/243-2778
Gina Glenne, Botanist, 970/243-2778

1.2 Methodology used to complete the review: This 5-year review was conducted by Gina Glenne, Botanist for the Western Colorado Ecological Services Field Office. An announcement initiating the 5-year review process and soliciting any new information was published on October 6, 2008, in the Federal Register (73 FR 58261). Information was officially accepted until December 5, 2008. We received input from the Black Canyon Land Trust, the Colorado Natural Areas Program (CNAP), and the Center for Native Ecosystems. All files pertaining to *Eriogonum pelinophilum* were reviewed and additional material was solicited from the Bureau of Land Management (BLM), the Black Canyon Land Trust, the CNAP, the Colorado Natural Heritage Program (CNHP), the U.S. Geological Survey, numerous GIS databases, private consulting firms, and others.

1.3 Background

1.3.1 FR Notice citation announcing initiation of this review: 73 FR 58261, October 6, 2008.

1.3.2 Listing history
Original Listing
FR notice: 49 FR 28562, July, 13, 1984
Entity listed: Species
Classification: Endangered rangewide

1.3.3 Associated rulemakings: Critical habitat was designated concurrently with the final listing rule in 1984. On July 24, 2006, we received a petition to amend the critical habitat designation for *Eriogonum pelinophilum* (Center for Native Ecosystems et al. 2006, p. 1). We published our 90-day finding on June 22, 2009, determining the petition presented substantial information indicating that revising

critical habitat for *E. pelinophilum* under the Endangered Species Act (Act) may be warranted (74 FR 29456). The subsequent 12-month finding is due to the Federal Register by September 21, 2009.

1.3.4 Review History: We completed a recovery plan for *Eriogonum pelinophilum* in 1988 (USFWS 1988, pp. 1-15). This plan was the last review of the species. Subsequently, a 5-year review of all listed species was initiated by the U.S. Fish and Wildlife Service (Service/USFWS) for all listed species (56 FR 56882, November 6, 1991). The notice summarized the listing status of all species listed under the Act prior to January 1, 1991, but did not further discuss species status nor did it propose or change the status of any species, including *Eriogonum pelinophilum*.

1.3.5 Species' Recovery Priority Number at Start of 5-year Review:

At the start of this review, the recovery priority number for *Eriogonum pelinophilum* was a 2c (USFWS, in litt., 2006, p. 1). This indicates that (1) populations face a high degree of threat; (2) recovery potential is high; (3) the entity is listed at the species level; and (4) the species is in conflict with construction or other development projects or other forms of economic activity.

Degree of Threat	Recovery Potential	Taxonomy	Priority	Conflict
High	**High**	Monotypic Genus	1	1C
		Species	2	**2C ***
		Subspecies/DPS	3	3C
	Low	Monotypic Genus	4	4C
		Species	5	5C
		Subspecies/DPS	6	6C
Moderate	High	Monotypic Genus	7	7C
		Species	8	8C
		Subspecies/DPS	9	9C
	Low	Monotypic Genus	10	10C
		Species	11	11C
		Subspecies/DPS	12	12C
Low	High	Monotypic Genus	13	13C
		Species	14	14C
		Subspecies/DPS	15	15C
	Low	Monotypic Genus	16	16C
		Species	17	17C
		Subspecies/DPS	18	18C
		Subspecies/DPS	18	18C

1.3.6 Recovery Plan or Outline

Name of plan: Clay-Loving Wild Buckwheat (*Eriogonum pelinophilum*) Recovery Plan (USFWS 1988, pp. 1-15)
Date approved: November 10, 1988

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment Policy

2.1.1 Is the species under review a vertebrate?

No, the species is a plant and, therefore, the Distinct Population Segment policy is not applicable.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

____ Yes.
__X__ No. The recovery plan contains demographic objectives. The objective of the recovery plan was to secure a sufficient number of healthy populations (sites) in their natural habitat to warrant delisting. The initial goal was to secure 10 populations (sites) for downlisting and 20 populations for delisting" (USFWS 1988, p. 5). The terms "healthy," "secure," and "population" are not further defined and so are not measurable.

2.2.2 Adequacy of Recovery Criteria

2.2.2.1 Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

____ Yes.
__X__ No. The criterion does not directly address threats to the species.

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

____ Yes.
__X__ No. None of the listing factors have corresponding criteria.

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

The 1988 recovery plan states "the objective of this recovery plan is to secure a sufficient number of healthy populations (sites) in their natural habitat to warrant delisting." "The initial goal will be to secure ten populations (sites) for downlisting and twenty populations for delisting" (USFWS 1988, p. 5).

Within this 5-year review, we use the terms Element Occurrence (EO) and population interchangeably. Each EO consists of one to several smaller polygons or sites. At the time the recovery plan was written there were "six metapopulations with 20 sites." This wording suggests that EOs or populations as we have defined them here may have been equivalent to metapopulations. The "sites" in the recovery plan may be equivalent to sites as we use them here. "Secure" is further defined in the recovery narrative as secured from threats which are primarily surface-disturbances (e.g., off-road vehicles (ORVs) and all-terrain vehicles) as well as one-time disturbances (e.g., pipelines). Surface disturbances or one-time disturbances have or continue to occur at most populations today

(see 2.3.2 below). Because no EOs are secured from threats and because of the large proportion of sites on private land with no protections, we do not consider the downlisting or delisting recovery criterion to be met.

2.3 Updated Information and Current Species Status: Because the most recent, thorough assessment of *Eriogonum pelinophilum* occurred when the recovery plan for the species was written in 1988, the majority of information we have for the species has been gathered since. When *Eriogonum. pelinophilum* was first listed, it was known from only one population with roughly 10,000 individuals at the northern end of the species' range, as we understand its distribution today (49 FR 28562). In 1984, the primary threat to the only known population on private land was that it could be fenced and used for horse corrals and pastures (49 FR 28562).

At the time the recovery plan was written in 1988, 6 metapopulations with 20 sites were known with roughly 45,000 to 50,000 individuals occupying 400 to 500 acres (ac) (162 to 202 hectares (ha)) (USFWS 1988, p. 1). Threats listed in the recovery plan include agricultural and residential development, road networks, irrigation canals, livestock grazing, and ORVs (USFWS 1988, p. 3). Here we present the status of the species as we understand it today: more individuals, more threats particularly through increased population growth, and an improved understanding of the species' biology. In general, almost all of the information we present below represents a change and increase in our understanding of the species status and threats since the last status review in conjunction with the recovery plan in 1988.

2.3.1 Biology and Habitat

2.3.1.1 Species' biology and life history: *Eriogonum pelinophilum* was first collected near Hotchkiss, Colorado, in Delta County in 1958 by Howard Gentry. This collection is now the type (original) collection of the species at Lawhead Gulch (Reveal, in litt., 2009, p. 1). The species was first recognized as its own taxon in 1969, and officially described by James Reveal in 1973 (Reveal 1969, pp. 75-76; 1973, pp. 120-122). No other locations were identified until 1984, after the final listing rule (CNAP 1986, p. 1).

Eriogonum pelinophilum is a low growing, rounded, densely branched subshrub in the buckwheat family (Polygonaceae). It has dark green inrolled leaves that appear needlelike, and clusters of white to cream colored flowers with greenish-red to brownish-red bases and veins at the end of the branches. The *Eriogonum* genus has undergone rapid evolution in the arid regions of the West, with roughly 250 species. This native North American genus is second only to *Penstemon* (beardtongue) in number of species (Reveal 2005a, p. 1).

The life history of *Eriogonum pelinophilum* has been examined in two short-term demography studies. The first study was conducted on BLM lands at the Fairview Research Natural Area (both Fairview North and Fairview South) in 1987 and 1988 (CNAP 1986; 1987). The second study was conducted at the Wacker Ranch where life history information was gathered in 1990, 1992, 1993, and 1994 (Carpenter and Schulz 1994), and again in 2008 (Lyon 2008). Neither of these studies occurred over sufficient time periods nor were they conducted frequently enough to calculate critical life history stages for *E. pelinophilum*'s success. In addition, neither study was conducted with enough demographic detail to assist in the development of a population viability model. However, both studies do add to our understanding of the species.

The CNAP life history study for *Eriogonum pelinophilum* was conducted in 1987 and 1988, but we have results only from 1987. We have made several attempts to find a copy of the 1988 paper, but have been unable to do so. The study established four permanent monitoring plots, two plots at the BLM Fairview North Area of Critical Environmental Concern (ACEC) and two plots 4 miles (mi) (6 kilometers (km)) south at the Fairview South ACEC, tagging 220 plants (CNAP 1987, p. 1). The study found significant differences in aerial cover, flowering rate, and vigor of *E. pelinophilum* between plots (CNAP 1987, p. 3) suggesting site characteristics may influence plant characteristics such as abundance and size. The study found that *Artemisia nova* (black sagebrush) was the dominant species by basal area in most plots, but that *E. pelinophilum* had the greatest density and frequency (CNAP1987, p. 8). *E. pelinophilum* occurred in the highest densities away from other shrubs (CNAP 1987, p. 8).

Carpenter and Schultz (1994, p. 2) established six permanent *Eriogonum pelinophilum* demography transects at Wacker Ranch, five of which were relocated in 2008 (Lyon 2008, p. 1). Mortality from 1990 to 1994 averaged 6.0%, but varied from 26.1 to 1.2% and was spread across age classes (Carpenter and Schultz 1994, p. 3). Growth rates and the number of seedlings observed varied considerably by transect during the study (Carpenter and Schultz 1994, p. 3). The authors concluded from the study that *E. pelinophilum* is very long-lived and that environmental conditions vary considerably over relatively short distances.

When the site was revisited in 2008, the number of individuals had increased (37%) and the average size of plants had increased since 1990 (Lyon 2008, p. 1). Of the 310 plants tagged in 1990-1994, the 2008 study relocated 227 tags (73%): 49 with no *Eriogonum pelinophilum* plants, 60 attached to dead plants, and 121 attached to live plants. Of the 181 tags that were attached to *E. pelinophilum* plants, 67% remained alive after 18 years. In addition to the 181 tagged plants, at least 321 new plants

were located along the 5 relocated transects (Lyon 2008, p. 2). Results were not statistically adequate to detect a change in species abundance (Lyon 2008, p. 3), but do suggest that the species may be stable or increasing at the Wacker Ranch site and supports the conclusion that the species is long-lived.

Reproduction and pollination of *Eriogonum pelinophilum* has been considered in two studies conducted in the early 1990s (Bowlin et al. 1992; Tepedino 2009). The first paper reported on the reproduction of *E. pelinophilum* at an undisturbed site, the Wacker Ranch. The study found that *E. pelinophilum* requires a pollinator, and for much of the flowering season is the most abundant species in bloom in its habitat (Bowlin et al. 1992, p. 300). Flowering typically occurs from late May to early September with individual flowers lasting fewer than 3 days (Bowlin et al. 1992, p. 298). Over 50 species of insects visited *E. pelinophilum* flowers (Bowlin et al. 1992, pp. 299-300). Roughly half of these 50 species were native bees, and 18 species were native ants (Bowlin et al. 1992, pp. 299-300). Seed set was similar between plants that were pollinated by ants versus flying pollinators, suggesting the importance of ants to pollination of the species (Bowlin et al. 1992, p. 299). Some fruits are removed by harvester ants (Bowlin et al. 1992, p. 299); however, no information is available for the species on seed dispersal mechanisms.

The second paper, from a study conducted in 1990 (but only recently made available), examined differences in pollinators present on *Eriogonum pelinophilum* between a highly disturbed site and lightly disturbed site. *E. pelinophilum* plants were smaller at the disturbed site but the number, richness, diversity, or equitability of pollinators was not significantly different between sites (Tepedino 2009, p. 38). Of all *Eriogonum* species studied to date, none has as many pollinators as *E. pelinophilum* (Tepedino 2009, p. 39). These pollinators cover a wide array of taxonomic and functional types of insects that visit the flowers for nectar and sometimes for pollen with no single pollinator or group of pollinators being especially important for *E. pelinophilum* pollination (Tepedino 2009, pp. 38-39, Appendix A).

Because so many insects visit *Eriogonum pelinophilum* and because of the wide array of different pollinators, pollination and preservation of specific pollinators should not be a significant concern in conservation of the species (Tepedino 2009, p. 38). Instead, conservation of *E. pelinophilum* should focus primarily on the conservation of undisturbed habitat and associated plant species in as many separate areas as possible to manage for the wide array of pollinators (Tepedino 2009, p. 40).

2.3.1.2 Abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends: Based on information provided by the CNHP in January 2009, there are currently 20 *Eriogonum pelinophilum* EOs (Figure 1, Table 1) (CNHP 2009, pp. 1-81; USFWS 2009a, Table 1). The EOs are used by Natural Heritage Programs to track rare species and are defined as an area where a species is or was present. For *E. pelinophilum*, EOs are comprised of one to many polygons (sites) based on a standardized maximum separation distance, in this case 1.2 mi (2 km) across suitable habitat and 0.6 mi (1 km) across unsuitable habitat (CNHP 2007, p. 1). However, upon closer examination we found that several EOs as designated by CNHP were within 0.6 mi (1 km) of one another. For the purpose of this discussion we have left the EOs as designated by CNHP (Figure 1).

Of the 12 EOs where *Eriogonum pelinophilum* is currently known to exist, 2 are considered an A rank, 6 are considered a B rank, 3 are considered a C rank, and 1 is considered a D rank (CNHP 2009, pp. 1-81). The A rank represents *E. pelinophilum* occurrences with the largest size, highest number of individuals, and the best quality habitat, while D represents occurrences with the smallest size, the lowest number of individuals, and the worst quality habitat (Table 1) (CNHP 2007, pp. 1-2; 2009, 81 pp.; USFWS 2009a, Table 1).

The most recent rangewide population estimate for all A through D ranked *Eriogonum pelinophilum* EOs is very roughly 278,000 individuals across 582 occupied ac (233 ha) (Table 1). Based on the acreage of the EOs, roughly 46% of the acres are in private ownership (14% of the total acres have conservation easements), and 54% of the acres are managed by either BLM or CNAP (CNHP 2009, 81 pp.; USFWS 2009a, Table 1). An increase in rangewide population estimates from pre-2007 numbers to 2009 is largely attributable to increased survey efforts that greatly expanded the number of known locations and individuals at one EO (018--an increase from roughly 30,000 to 250,000 individuals) (CNHP 2009, EO-018; Ferguson 2007, pp. 2 and 4). Survey intensity and the years surveys occurred are not consistent among the EOs.

Of the known 20 *Eriogonum pelinophilum* EOs, 7 have not been relocated in over 20 years and are considered historical (Table 1). Many of these historical sites are on private lands and have not been revisited because of the difficulties contacting and obtaining permission to resurvey on private lands. Drive-by surveys in February 2009 indicated that the majority of these sites still have suitable habitat and so may still have *E. pelinophilum*. We include these sites within the tables presented here, but do not include the past estimates of individuals in our count because of the lack of reliability of the data. Based on historical estimates, an additional 3,500 individuals could occur within these EOs (CNHP 2009, pp. 1-81, USFWS 2009a, Table 1).

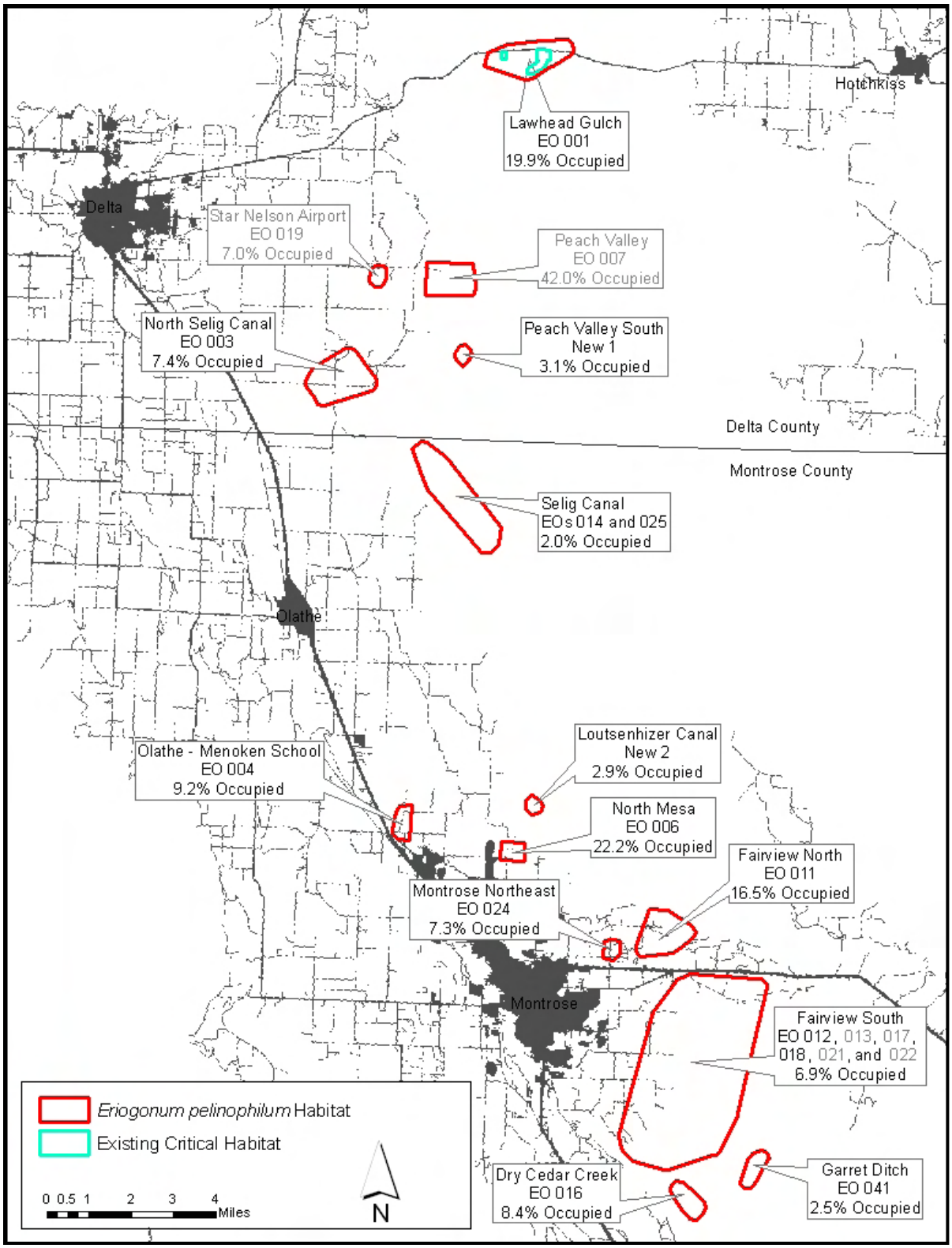

FIGURE 1.
Distribution of *Eriogonum pelinophilum* habitat in Colorado with EO Numbers.

TABLE 1. CNHP *Eriogonum pelinophilum* EOs with additional sites and modifications. EO ranks A, B, C, and D represent the quality of the EO (from best to worst quality, respectively), H indicates an EO has not been visited in over 20 years, and F indicates an EO that could not be relocated upon subsequent visit. H and F ranked EOs are in lighter font.

EO #	EO Rank	Acres*	Most Recent Estimated Number of Individuals	Population Name	Land Management with Rough Estimates of Ownership Percentage
001	B	79	2,100	Lawhead Gulch	private
003	B	67	2,500	North Selig Canal	33% BLM- 66% private
004	B	17	1,000	Olathe South	private
006	B	15	3,000	North Mesa	private
007	H, C		300	Peach Valley	private
011	C	110	1,000	North Fairview	50% BLM - 50% private
012	B	25	1,775	Sunshine Road	5% BLM – 95% private
013	H, C	4	300	Cedar Creek	private
014	A	7	10,000	Candy Lane/Peach Valley	BLM
015	F, may no longer exist	70	6,000	Selig Canal 3	private
016	C	13	650	Dry Cedar Creek	BLM
017	H, C	20	1,000	Oak Grove Road	private
018	A	212	250,000	Wacker Ranch/Fairview South	70% BLM – 20% Colorado State (CNAP) – 10% private
019	H	2	600	Star Nelson Airport	private
021	H, C	26	800	Montrose East	private
022	H, C	19	675	Montrose East	private
023	H, likely 001			Hotchkiss	unknown
024	D	8	100	Montrose Northeast	private
025	B	18	3,700	Selig Canal	90% BLM – 10% private
041	B	6	2,000	Garret Ditch	66% BLM – 33% private
New 1	none	3	100	Peach Valley North	33% BLM – 66% private
New 2	none	2	500	Loutsenhizer Canal	BLM

* Acreages are approximate, are based on a CNHP geospatial analysis when available, and on estimates when a geospatial estimate is not available. Methods for estimating acreage vary between surveys. Historical (H) or failed to find (F) counts and acres are not included in totals although drive by surveys indicate that at most H EOs the habitat is at least still intact. Ownership percentages are based on the acreages listed in the table. EO-023 is likely the same as EO-001.

EO-023 represents the original collection done by Gentry in 1955. The herbarium label on the collection reads "Hotchkiss." Dr. James Reveal contacted Gentry and relocated the site, which is now EO-001 (Reveal in litt., 2009, p. 1). Therefore, EO-023 should be removed from the list of historical locations and merged into EO-001. EO-015, was originally documented in 1985, but did not contain plants in 1998. This site is ranked as a "failed to find" or F (CNHP 2009, EO-015, USFWS 2009a, Table 1).

We are aware of two additional populations of *Eriogonum pelinophilum* (Peach Valley North and Loutsenhizer Canal) that are not incorporated into the CNHP database and, based on appropriate separation distances, would comprise two new EOs (Table 1). One site has fewer than 100 plants and the other site has an estimated 500 plants (BIO-Logic Environmental 2004, Site 219 p. 7 and spatial data; BIO-Logic Inc. 2008, Figure 2 and spatial data; Boyle, in litt., 2009, map).

We have a short report in our files prepared by Dr. James Reveal (2006, p. 2) with a map portraying seven extirpated *Eriogonum pelinophilum* locations. These locations are not included in the CNAP's database. We do not have any information on how these extirpations were determined, their exact locations, if they were portions of other EOs, or how many plants were lost. Therefore, they are not included in our assessment of populations (Table 1).

No trend or demographic monitoring occurred for the species until the late 1980s. Monitoring has not occurred over a long enough period to know if *Eriogonum pelinophilum* at any given EO is declining or increasing. The uncertain status of seven historical EOs, one EO where recent surveys failed to find plants, and the reported seven extirpations is of concern given the species' limited range and numbers.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.): Genetic variation has not been studied and, therefore, is unknown. The isolation and small aerial extent of several *Eriogonum pelinophilum* EOs in addition to the fact that the species is outcrossing suggests that a loss of genetic variation, genetic drift, or inbreeding may be possible at these sites (Ellstrand and Elam 1993, pp. 217-242).

2.3.1.4 Taxonomic classification or changes in nomenclature: *Eriogonum pelinophilum* has been considered a close relative or synonymous with *E. clavellatum* and a close relative of *E. contortum* (Reveal 2006, p. 3). All three species are currently recognized as distinct species (Reveal 2005b; Kartesz, in litt., 2009, p. 1). The most recent assessment by James Reveal,

an expert in *Eriogonum* taxonomy, indicates that preliminary genetic analyses show that *E. pelinophilum* is allied to, but distinct from *E. clavellatum*, and both are distinct from *E. contortum* (Reveal 2006, p. 3).

Morphological and distributional differences also occur between *Eriogonum pelinophilum*, *E. contortum*, and *E. clavellatum*. *E. pelinophilum* has white flowers and occurs in Delta and Montrose Counties, Colorado, whereas *E. contortum* has yellow flowers and occurs farther north in Mesa and Garfield Counties, Colorado and Grand County, Utah (Spackman et al. 1997, *E. pelinophilum* page). *E. pelinophilum* is shorter, measuring 2 to 4 inches (in.) (0.5 to 1 decimeters (dm)), has smaller involucres (bracts below the flowers), with petals all the same length. *E. clavellatum* is taller measuring 4 to 8 in. (1 to 2 dm), has larger involucres, with two different sized petals, and is only known from Montezuma County, Colorado, and adjacent San Juan Counties in Utah and New Mexico (Spackman et al. 1997, *E. pelinophilum* page; Reveal 2005c, p. 1).

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g., increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g., corrections to the historical range, change in distribution of the species' within its historic range, etc.): *Eriogonum pelinophilum* is endemic to the rolling clay (adobe) hills and flats immediately adjacent to the communities of Delta and Montrose, Colorado. The plants extend from near Lazear, east of Delta on the northern end of the species' range, to the southeastern edge of Montrose in Delta and Montrose Counties, Colorado, and occurs from 5,180 to 6,350 feet (ft) (1,579 to 1,965 meters (m)) in elevation (Figure 1) (CNHP 2006, p. 3; 2009, spatial data; Nature Serve 2008, pp. 4-5; USFWS 2009a, Table 1). When a rectangle is drawn around all known occurrences, it measures roughly 11.5 mi (18.5 km) from east to west and 28.5 mi (46 km) from north to south (CNHP 2009, spatial data).

When *Eriogonum pelinophilum* was listed, it was known from only one population with roughly 10,000 individuals at the northern end of the species' currently known range (49 FR 28562). At the time the recovery plan was written in 1988, 6 metapopulations with 20 sites were known with roughly 45,000 to 50,000 individuals occupying 400 to 500 ac (162 to 202 ha) (USFWS 1988, p. 1). Today, the species is known from 12 existing (extant) EOs with 278,000 plants, 2 additional sites with 600 plants, and 6 historical sites that may still be extant and had roughly 3,500 individuals over 20 years ago. We assume the increase in the number of populations and individuals over time is not a result of the plant spreading, but is instead a product of increased survey effort. We base this assumption on *E. pelinophilum's* relatively long lifespan and on the fact that populations known for over 20 years are in generally the same locations.

To the best of our knowledge, no entire EOs of *Eriogonum pelinophilum* have been lost (extirpated). We are unsure of the status of the historical and failed to find EOs. We are aware of several instances where portions of EOs have been lost as addressed in 2.3.2.1 below.

We conducted a geospatial analysis examining development and suitable vegetation for *Eriogonum pelinophilum* throughout its range. As part of this analysis, we created polygons around all the sites in an EO (including all EOs historical or otherwise, except EOs-023 and -015). If EOs were within 0.6 mi (1 km), we included them within one polygon. We also included both the Peach Valley South and Loutsenhizer Canal sites (BIO-Logic Environmental 2004, Site 219 p. 7 and spatial data; BIO-Logic Inc. 2008, Figure 2 and spatial data; Boyle, in litt., 2009, map). We then buffered the polygons by 820 ft (250 m). Once buffered, several of these sites were under one square mile and on private lands (EOs 004, 006, 019, and 024). In these instances we did not utilize data from the Colorado Natural Heritage Program. Instead, we utilized roadside survey information and old reports from the Rocky Mountain Herbarium (RMHTE 1985, pp. 1-2; Ewing and Glenne 2009a, pp. 1-15). The buffer was designed to consider potential dispersal sites and habitat for pollinators and to attempt to better consider private lands, given our general lack of knowledge of private land sites. These polygons were used to generate Figures 1 through 6 in this status review.

The result was 14 *Eriogonum pelinophilum* polygons with 12,765 ac (5,166 ha) of habitat (larger polygons in Figures 2, 3, and 4) (USFWS, Western Colorado Ecological Services, pers. comm., 2009, slide 6). Within these polygons, we found roughly 6% of the area (7,759 ac/3,142 ha) was comprised of suitable native vegetation with the remainder largely comprised of agricultural fields or some sort of development (Southwest Regional Gap Analysis Project 2004, spatial data; USFWS, pers. comm., 2009, slide 11). Land cover within polygons varied considerably ranging from only 10% native vegetation to 100% native vegetation (Southwest Regional Gap Analysis Project 2004, spatial data; USFWS, pers. comm., 2009, slide 11).

We also looked at private ownership within these polygons. We found 74% (9,486 ac/3,840 ha) of these polygons were comprised of private ownership, ranging from 11 to 100% private ownership within each polygon (Figure 4) (USFWS, pers. comm., 2009, slide 13).

Of the 12 known *Eriogonum pelinophilum* EOs and the 2 additional populations known to the Service, 4 occur wholly on private land; 6 occur on a combination of BLM and private land; 1 occurs on BLM, Colorado State (Colorado Natural Areas), and private; and 3 occur wholly on BLM land (Table 1, Figure 4). The six historical EOs we include here all occur on private lands. Based on the geospatial analysis buffering populations described in the preceding paragraph we estimate there are roughly

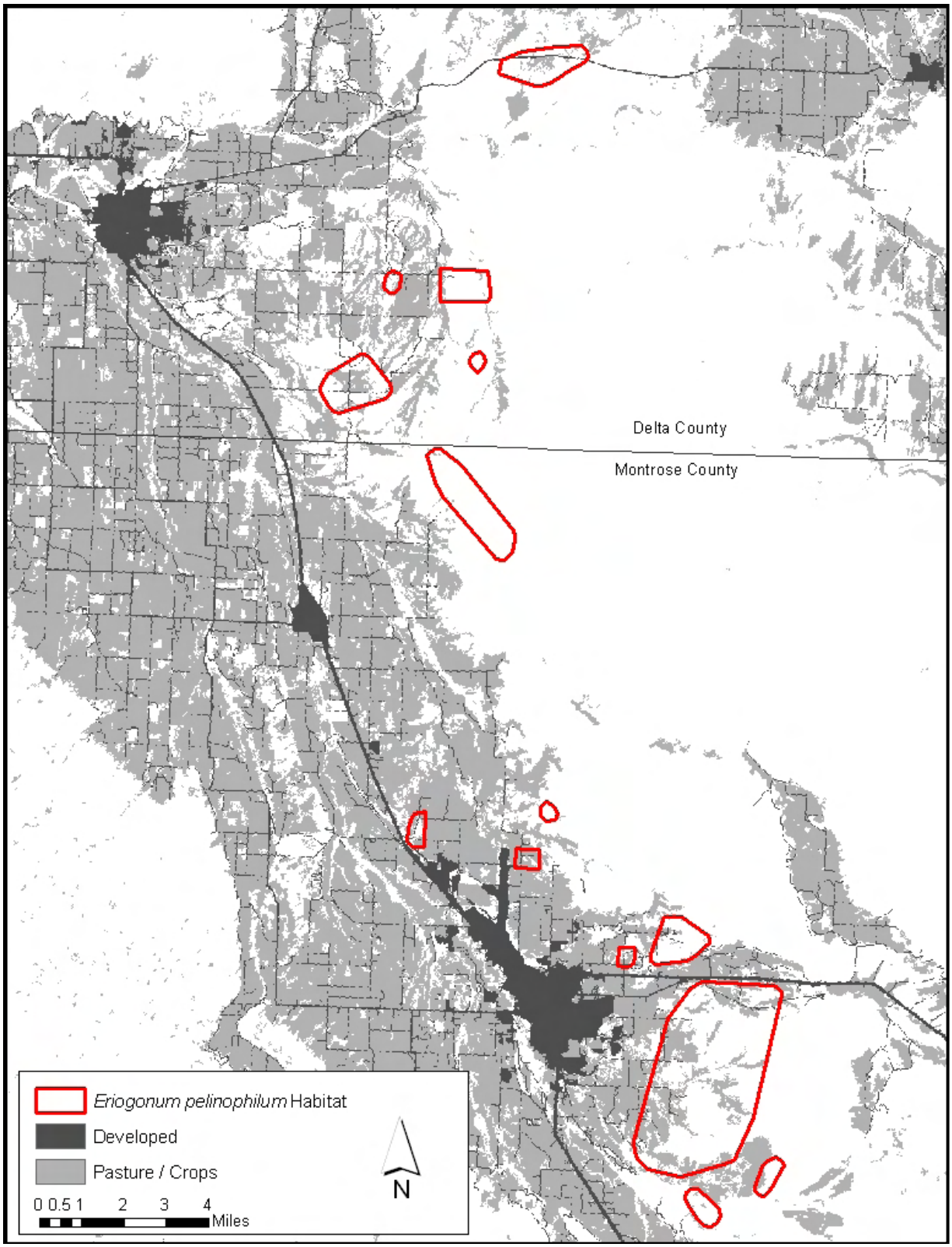

FIGURE 2.
Developed and agricultural lands, generated in 2007, across *Eriogonum pelinophilum*'s habitat.

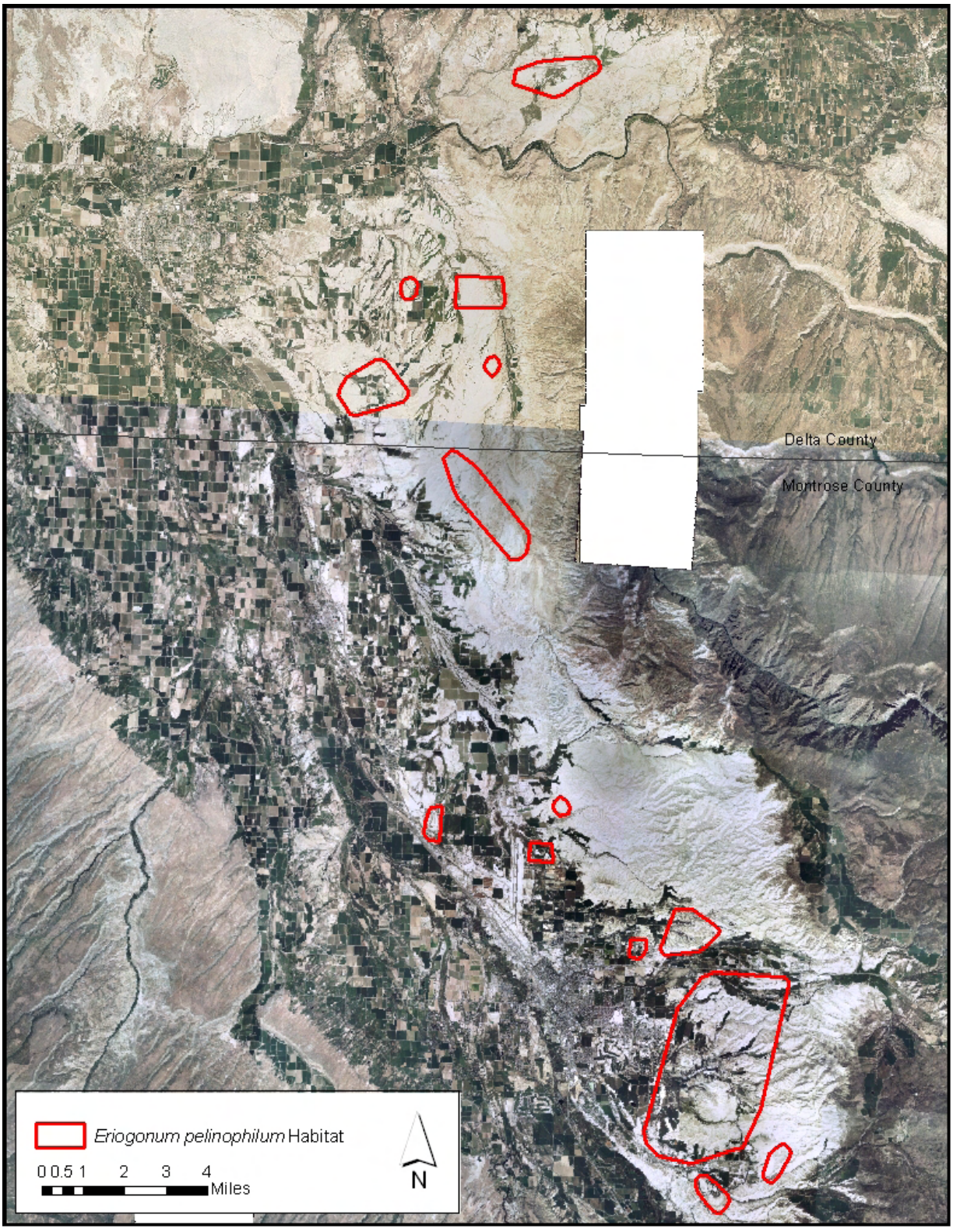

FIGURE 3.
Satellite imagery from 2006 depicting development within *Eriogonum pelinophilum's* habitat.

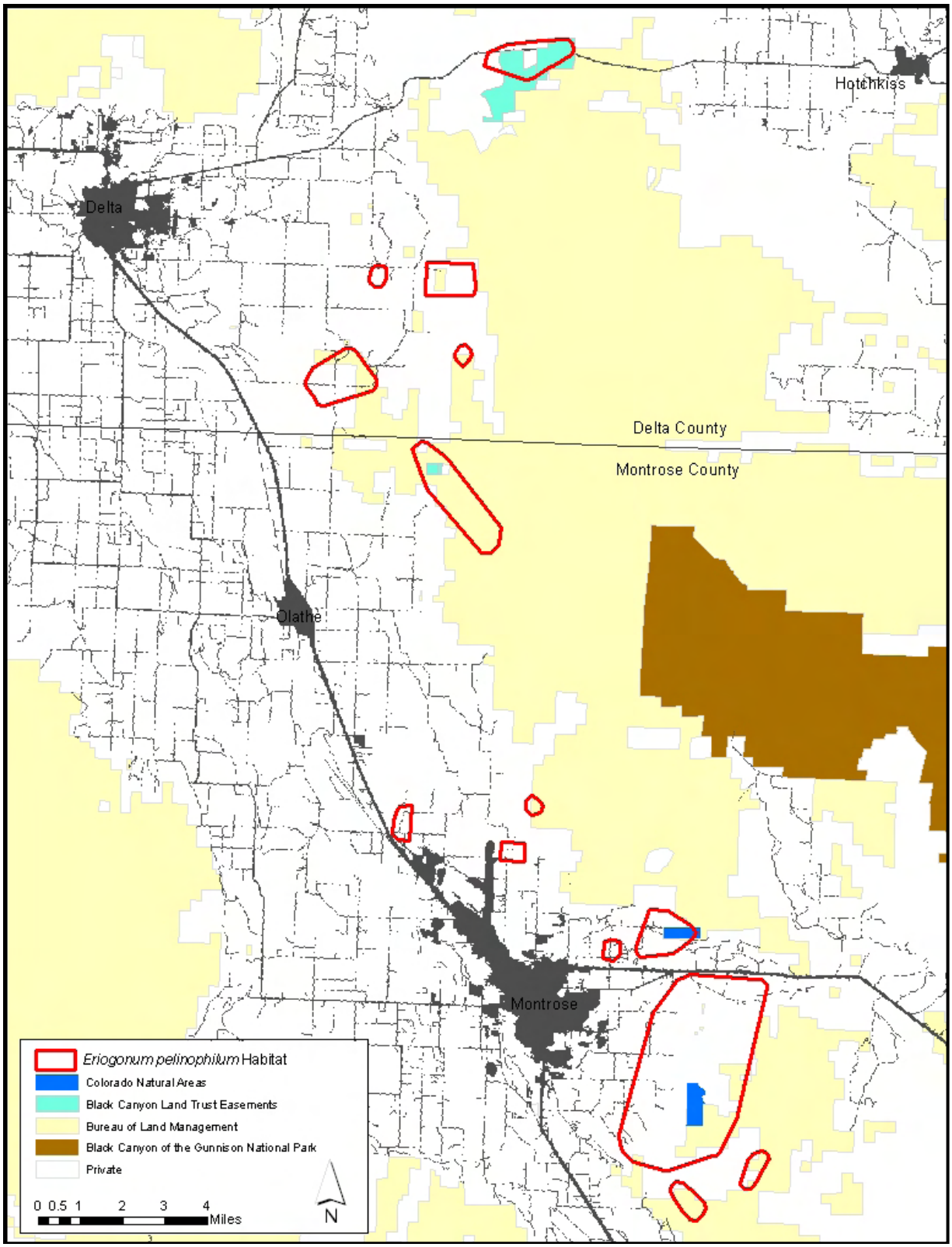

FIGURE 4.
***Eriogonum pelinophilum* habitat and land management status.**

14 populations with 12,765 ac (5,166 ha) of habitat (Table 2) (USFWS 2009, pers. comm., slide 6). Within the 74% private lands, 6% (600 ac/243 ha) are part of the Black Canyon Land Trust Conservation Easements. The Wacker Ranch site (43 ac/17 ha) also was part of the private landownership acreage as half a percentage because the private ownership layer has not yet been updated since the property changed hands. This site should be considered State managed. State landsmanaged by the CNAP and The Nature Conservancy represent 0.3% (43 ac/17 ha). The BLM lands represent 26% and 3,279 ac (1,327 ha) with 347 ac (140 ha) as part of the Fairview North (142 ac/57 ha) or Fairview South ACECs (205 ac/83 ha). The Gunnison Gorge National Conservation Area (GGNCA) represents roughly 57% of the total BLM habitat area (1,856 ac/751 ha) and the Uncompahgre Field Office represents the remaining 43% (1,421 ac/575 ha) (Table 2, Figure 4). The percentages here are for the ownership of aerial extent. The number of individuals is not accounted for here, but can be viewed in Table 1.

TABLE 2. *Eriogonum pelinophilum* and suitable habitat based on circling the EOs (including historical EOs) and buffering by 820 ft (250 m) with land management acreage estimates.

	Acres	Hectares	% of Total Acres	Comments
TOTAL	12,765	5,166	100	
Private	9,483	3,823	74	
Black Canyon Land Trust	600	243	6	This does not represent the entire acreage of the easements
State	43	17	0.3	
BLM	3,279	1,327	26	
GGNCA	1,856	751	15	57% of the total BLM area
Fairview North ACEC	142	57	1	Part of the GGNCA
Uncompahgre Field Office	1,421	575	11	43% of the total BLM area
Fairview South ACEC	205	83	2	Part of the Uncompahgre Field Office; has at least half of all the individuals

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem): The Delta/Montrose area is dry, receiving an average of 8 to 9 in. (20 to 23 centimeters (cm)) of precipitation a year (Western Regional Climate Center 2009a, p. 1; 2009b, p. 1). Winters are cold, with January being the coldest month, averaging 12 to 39°F (-11 to 4°C). Summers are hot, with July being the hottest month, averaging 55 to 93°F (13 to 34°C) (Western Regional Climate Center 2009a, p. 1; 2009b, p. 1).

The soils where *Eriogonum pelinophilum* are found are described as whitish, alkaline (with a pH over 7), clay soils of the Mancos shale formation, a Cretaceous marine sediment formation. Mancos shale outcrops are relatively barren of vegetation in comparison to surrounding areas (Potter et al. 1985, p. 137). Several components of the clay soils of the Mancos shale limit plant growth: soils are fine-textured and lose moisture more readily; clay soils are compactable which limits gas exchange and thus root growth; clay soils hold more water which is unavailable for plant use; water infiltration is slow; and the extreme swelling and shrinking of the soils limits water availability and oxygen exchange for plant roots (summarized in Potter et al. 1985, p. 139). In addition, the soils are calcareous (containing calcium carbonate) with high pH values making for difficult growing conditions.

Eriogonum pelinophilum is associated with silty clay and silty clay loam soils that can be classified as normal or saline-sodic in relation to pH, electrical conductivity, and sodium adsorption ratio (SAR) of saturated soil paste extracts (Grauch, in litt., 2009, p. 2). The principal chemical difference between occupied and unoccupied soils is that the occupied soils have fairly constant SAR values with depth (mean SAR values range from 11 at the surface to 8 at depth) and the SAR values of unoccupied soils vary dramatically with depth (the mean SAR value at the surface is 3 and at depth is 33). Electrical conductivity values of the saturated soil paste extracts have a similar pattern of variation with depth (Grauch, in litt., 2009, p. 2). A subsequent study comparing the soil samples collected in the study above to soil samples across the Mancos shale terrain of the GGNCA are underway and are expected to be available within the next 3 years.

Soils appear to play a large role in the distribution of *Eriogonum pelinophilum.* Therefore, we conducted a geospatial analysis using Natural Resource Conservation Service (NRCS) soil data (Paonia and Ridgeway soil surveys - NRCS 2006a, metadata; 2008, metadata) to better understand the distribution of *E. pelinophilum* (Figure 5). We overlaid NRCS soil types with the distribution of *E. pelinophilum* in an effort to determine which soil types were most common where the plant resides. For this analysis, we buffered all known locations by 33 ft (10 m). We employed this buffer so that *E. pelinophilum* sites represented by a point would more accurately represent the plant habitat where those points were located. For this reason, acreage figures differ significantly from those listed in the "Population Status" section below.

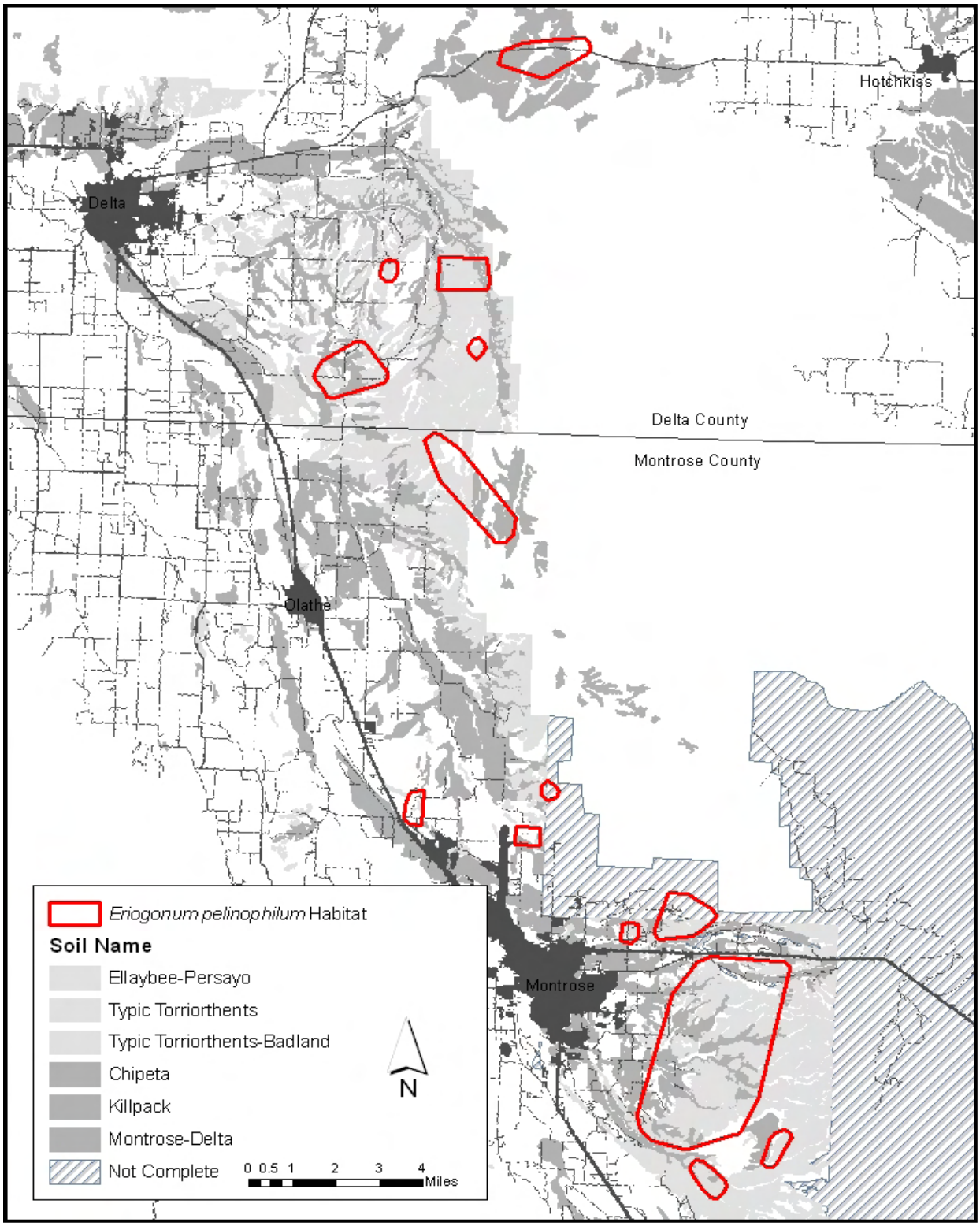

FIGURE 5.
Eriogonum pelinophilum **habitat and the six most common soil types for the species. The lightest gray shading depicts the three soil types where the plant is found (60.6%), the medium gray shading represents the next most common soil types (22.7%).**

The Paonia and Ridgeway soil surveys differ in their descriptions of soil units, and 9% of habitat occupied by *Eriogonum pelinophilum* occurs where no soil survey has been conducted. Given these shortcomings, we found the following soils were most common within the 1,129 ac (457 ha) of occupied habitat of *E. pelinophilum*: **1)** typic torriorthents (both 10 to 25% slopes, and –Badland complex with 25 to 75% slopes) comprised roughly 35% (390 ac/158 ha); **2)** ellaybee-persayo silty clay loams (5 to 12% slopes) comprised roughly 26% (294 ac/119 ha); **3)** killpack silty clay loam (3 to 12% slopes) comprised roughly 7% (84 ac/34 ha); **4)** chipeta silty clay (3 to 30% slopes) comprised 7% (77 ac/31 ha); and Montrose-Delta complex (0 to 2% slopes) comprised 6% (64 ac/26 ha) (USFWS 2009b, Table 1). Soil types are described as erosion remnants weathered from calcareous shale and are highly erodible by water (Soil Conservation Service 1981, pp. 24, 39; NRCS 2006b, map unit descriptions). Several other soil types occurred within occupied habitat, but none comprised over 3% or 30 ac (12 ha).

Eriogonum pelinophilum plants are generally found within swales or drainages that are moister than surrounding areas. These swales are generally located in low-lying areas with rolling topography. Steeper, more barren slopes with soils that are more toxic to vegetation exist in the distance above where the plants occur, generally within 1 mi (1.6 km). *E. pelinophilum* plants are associated with small areas where snow lingers longer than surrounding areas because of their north and east facing aspects (Ewing and Glenne 2009b, p. 2).

Plant communities associated with *Eriogonum pelinophilum* are characterized by low species diversity, low productivity, and minimal canopy cover (NatureServe 2008, p. 4). The associated vegetation is sparse, with *E. pelinophilum* generally one of the dominant species (CNAP 1987, Table 2). In lower elevations near Delta, the dominant plant species is *Atriplex corrugata* (mat saltbrush), but at higher elevations near Montrose the dominant plant species is *Artemesia nova* (black sagebrush), although *A. corrugata* is still abundant (Southwest Regional Gap Analysis Project 2004, spatial data). Suitable vegetation is depicted in Figure 6 on the next page. Other associated species include *Atriplex confertifolia* (shadscale), *A. gardneri* (Gardner's saltbush), *Picrothamnus desertorum* (formerly *Artemisia spinescens*) (bud sagebrush), *Xylorhiza venusta* (charming woodyaster), and another local endemic *Penstemon retrorsus* (Adobe Hills beardtongue) (CNAP 1987, Table 2; Coles 2006, p. 1; NatureServe 2008, p. 4).

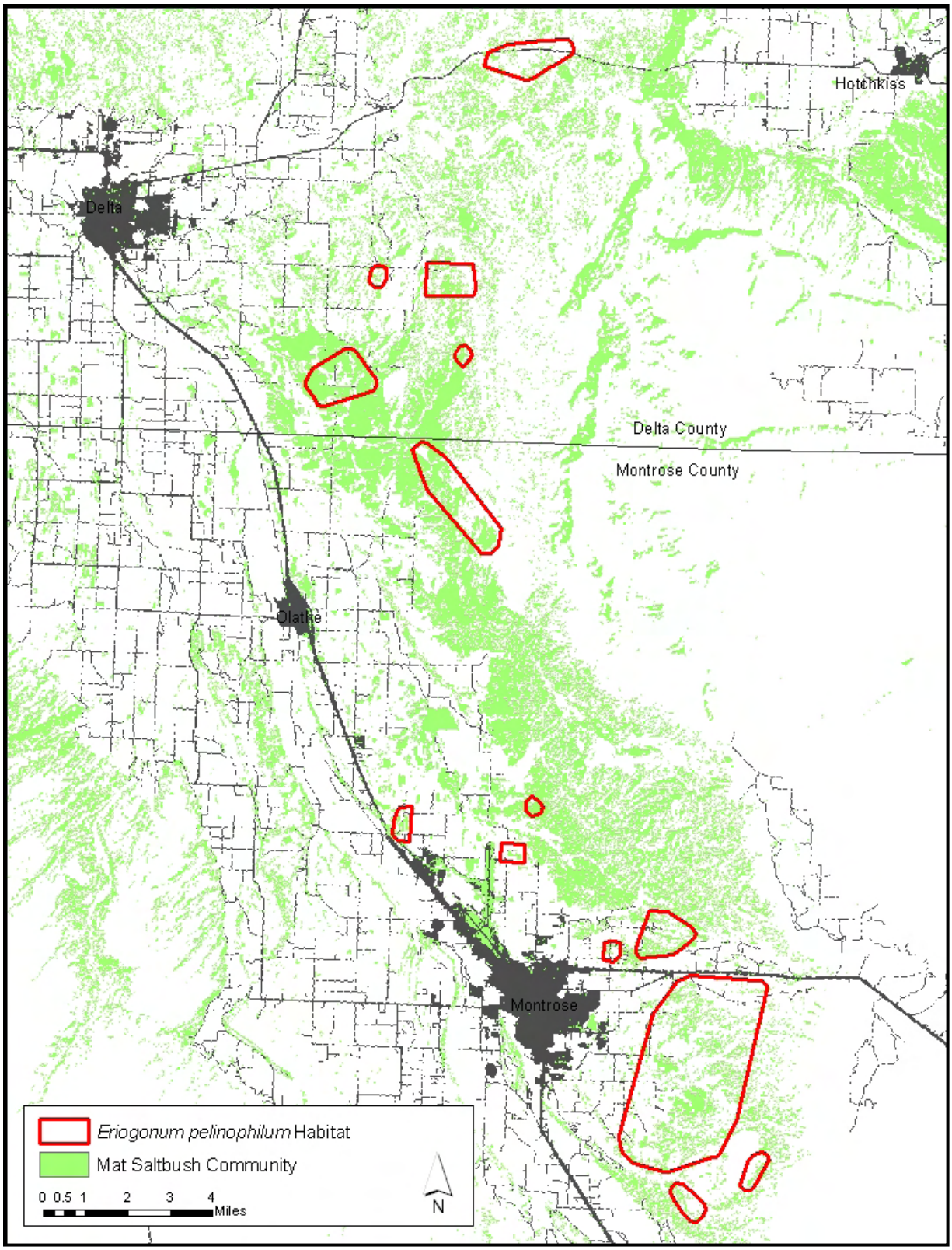

FIGURE 6.
Suitable vegetation, primarily mat saltbush, where *Eriogonum pelinophilum* habitat is found.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

For the discussion below, we have included impacts when they occur at *Eriogonum pelinophilum* EOs, both A through D ranked as well as those considered historical by CNHP. Most of these historical sites have not been visited in 20 years because of the difficulties surveying private land. We have included the historical EOs because our 2009 drive by surveys suggested that suitable habitat still remained at the majority of these sites. When a historical EO number is used in the following narrative, we have written the number in a gray shade (EOs 007, 013, 015, 017, 019, 021, 022, and 023). We have done the same for the one "failed to find" EO (015).

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range.

Here we identify and quantify the threats to *Eriogonum pelinophilum* from: 1) Agricultural, urban, and residential development; 2) ORV use; 3) nonnative invasive plants; 4) livestock use; 5) oil and gas development; and 6) herbicide use.

The original listing of the species identifies horse pastures and the subsequent removal of vegetation as the primary threat to *Eriogonum pelinophilum*. The final rule also states there is some ORV traffic over the population associated with the management of adjacent horse pastures (49 FR 28562). Urban and residential development, nonnative invasive plants, oil and gas development, and herbicide use were not discussed in the final listing rule. The threats included in the final listing rule are not quantified.

The recovery plan for *Eriogonum pelinophilum* lists agriculture, residential development, road networks, irrigation canals, right-of-way development on public lands, and ORVs as the primary threats to the species. Livestock grazing also is listed as a threat in the recovery plan although the use is said to have little impact, except with season-long grazing, year-long grazing, high-density stocking, and the use of sheep bedding grounds. Fragmentation, resulting from habitat loss, also is listed as a threat in the recovery plan (USFWS 1988, pp. 3-4). Threats from nonnative invasive plants, oil and gas development, and herbicide use were not addressed in the recovery plan. None of the threats were well quantified or discussed in detail in the recovery plan.

Agricultural, Urban, and Residential Development: *Eriogonum pelinophilum* is found along the margins and within the communities of Delta and Montrose, Colorado (Figures 2 and 3). Since *E. pelinophilum* was listed, these areas have experienced rapid growth. From 1990 to

2000, Delta County grew 33%, from around 20,980 to 27,834 individuals, and Montrose County grew 37%, from 24,423 to 33,432 individuals (CensusScope 2009, p. 1). From 2000 to 2007, the human population of Delta County grew 11%, from 27,834 to 30,959 individuals. Likewise, Montrose County grew 20%, from 33,432 to 40,263 individuals (Colorado State Demography Office 2008, pp. 1-2).

From 2007 to 2017, Montrose County is expected to grow by an additional 14,000 individuals, a 45% increase (Stehr 2007, p. 1). Delta County is projected to grow between 1.5 and 4.0% annually into the future (Santec, personal communication, 2007, p. 3). This growing human population means more houses, more subdivisions, more industrial development, and increased utility and transportation needs that could impact *Eriogonum pelinophilum* occurrences as well as its suitable habitat.

As discussed above, to the best of our knowledge, no entire EOs of *Eriogonum pelinophilum* have been lost (extirpated). We are unsure of the status of the historical and "failed to find" EOs. We are aware of several instances where portions of EOs have been lost. For example, the most numerous site within EO-003, the North Selig Canal, has been bulldozed, and a housing subdivision has been staked out atop (Ewing and Glenne 2009c, pp. 1-9). The western most portion of EO-001 was bulldozed (Alexander, in litt. 2009, p. 1). Satellite imagery indicates that at least 40 acres were bulldozed.

An agricultural field lies immediately adjacent to the largest occupied site of EO-001, Lawhead Gulch, suggesting that at least a portion of this site was lost. Dr. James Reveal documents seven sites as being lost to development, but the exact locations of these sites cannot be confirmed (Reveal in litt., 2009, p. 1). All EOs near Olathe and Montrose (EOs 004, 006, 011, 012, 013, 016, 018, 021, 022, 024, and 041) have agricultural fields or development immediately adjacent (Figures 2 and 3) suggesting that some habitat and plants were lost when these areas were developed. EO-041 partially occurs on an old agricultural trespass area on BLM lands that is no longer irrigated (CNHP 2009, EO 041). The losses described here do not include smaller losses where sheds, landscaping, trenches, dwellings, or other disturbances may have impacted *Eriogonum pelinophilum*.

Existing transmission lines currently run adjacent to or through five *Eriogonum pelinophilum* EOs (001, 012, 014, 016, and New 1) (Stinton, in litt., 2009, pp. 1-4 and spatial data). Currently, the Delta-Montrose Electric Associate (DMEA) and Tri-State Generation and Transmission Association, Inc. (Tri-State) have submitted a special use permit application for the East Montrose Electric System Improvement Project. This project includes the construction of two new substations and two

segments of transmission line running along the eastern sides of Delta and Montrose through *E. pelinophilum* habitat. The southern portion of this project, which would have impacted more *E. pelinophilum* sites, has been withdrawn (DMEA and Tri-State 2009, p. 1).

At least two *Eriogonum pelinophilum* sites (New 1 and New 2) were discovered when surveys were conducted for this project, are within the portion of the project that has not been withdrawn and, therefore, may be impacted (BIO-Logic Environmental 2004, Site 219 p. 7 and spatial data; BIO-Logic Inc. 2008, Figure 2 and spatial data; Boyle, in litt., 2009, map). Within the BLM's GGNCA Resource Management Plan (RMP), which directs management for the northern portion of *E. pelinophilum*'s range (EOs 003, 014, 015, and 025), almost all occupied habitat is identified as within areas recommended for utility right-of-way corridors (GGNCA RMP 2004, Figure 2-2).

The Delta and Montrose valley, commonly known as the Uncompahgre Valley, is traversed by a multitude of canals and ditches that are used for irrigation. In the early 1900s, over 470 miles of canals were already in the Uncompahgre Valley (Dudley 2009, p. 1). The first canal companies in the valley were formed in the early 1880s (Dudley 2009, p. 1). One of the Bureau of Reclamation's first five projects in the United States, initiated in 1903, diverted a portion of the Gunnison River into a 6-mile tunnel and a 12-mile canal to provide water to the Uncompahgre Valley. The tunnel was completed in 1909. In 1932, the Uncompahgre Valley Water Users' Association (Association) accepted control of the project from the Federal government, and the Association still manages the project today (Dudley 2009, p. 1). The North Selig, Selig, Peach Valley, East, South, and Loutzenhizer Canals are all large canals that run along the eastern side of the Uncompahgre Valley and through *Eriogonum pelinophilum* habitat. Because of their proximity to *E. pelinophilum* EOs, suitable habitat and plants were likely lost during the construction of these canals.

Large canals and some laterals run through or are immediately adjacent to *Eriogonum pelinophilum* EOs 003, 004, 007, 015, 016, 018, and 025. Smaller laterals and ditches run through or are immediately adjacent to EOs 011, 012, 013, 017, 019, 021, 022, and 041. All canals and laterals have roads on at least one side, and most have roads running along both sides. These canals and associated roads support nonnative invasive plants and provide conduits for their spread (see "nonnative invasive plants" below).

EO 015 was originally surveyed in 1985, and was revisited in 1998 when it was characterized as a moist (mesic) site due to canal leakage. This site may have been extirpated because of alterations to the habitat; however, we are uncertain because of possible mapping errors in the original EO, and concerns about whether the 1998 survey on this private land site was comprehensive (CNHP 2009, EO-015).

At least two EOs (013 and 025) have been impacted by canal maintenance through the excavation of accumulated sediment onto adjacent *Eriogonum pelinophilum* habitat that buries plants and suitable habitat (Ewing and Glenne 2009b, p. 2; USFWS 2009a, Table 1.). *E. pelinophilum* plants at the Fairview North ACEC were impacted in 2007 in association with pipeline construction activities (Sharrow, in litt., 2007, p. 1). This site has been subsequently restored, although no plants are reported from the restored area.

The Mancos shale soils where *Eriogonum pelinophilum* is found (see 2.3.1.6 above) is rich in salts and selenium. When unlined canals and laterals pass through these soils, or when these soils are irrigated, the water dissolves the toxic salts and carries them into waterways. The Colorado River system receives an estimated 360,000 tons of salt each year from the Uncompahgre Valley (Bureau of Reclamation 1994, summary). To reduce salt loading, a salinity control program was initiated in 1990. This program first eliminated flow through the canals during the winter and is now working to line laterals (Bureau of Reclamation 1994, summary). Because many of the *E. pelinophilum* EOs are located along laterals that are prioritized for lining, further impact to the species from these activities is a possibility.

A beltway around the City of Montrose has been proposed that would run near several EOs of *Eriogonum pelinophilum* (USFWS, in litt., 2006, p. 2). The alignment, as currently proposed, runs generally to the west of most known occurrences and not through BLM lands (Jenson, in litt., 2009, p. 1). The route will be built in pieces, will not be built in its entirety for 20 or 30 years, and is intended to be built and used when the Montrose community is larger (Jensen, in litt., 2009). The private lands where the beltway has been proposed have generally not been surveyed for *E. pelinophilum*. Because the beltway route is not finalized, the installation is not imminent, and because plant surveys have not occurred along the route it is difficult to fully assess the effects of this beltway on the species.

Roads pass through or run adjacent to many *Eriogonum pelinophilum* EOs. Some of these roads are paved (EOs 001 and 003), some are gravel roads (EOs 003, 004, 007, 011, 012, 013, 014, 017, 021, 022, and 025), and others are small dirt roads (EOs 003, 007, 011, 012, 014, 018, 025,

and New 1) (USFWS 2009a, Table 2). All of these roads increase the chances for ORV use because of the increased ease in access. In addition, roads serve as conduits for the invasion of nonnative plants (Gelbhard and Belnap 2003, pp. 420-432).

Increasing development continues to fragment and impact *Eriogonum pelinophilum* and its habitat (Figures 3 and 4). This development includes residential and industrial buildings, agricultural fields, power lines, canals, and roads. At least two populations (EOs 004 and 006) are completely surrounded by development and of very limited aerial extent. This isolation and small population size suggests that a loss of genetic variation, genetic drift, or inbreeding may be possible at these two EOs as well as other EOs with adjacent development, thereby reducing the resiliency of these populations (Ellstrand and Elam 1993, pp. 217-242).

We estimate that roughly 40% of *Eriogonum pelinophilum* habitat has already been impacted by buildings or agricultural fields (USFWS, pers. comm., 2009, slide 11). Almost 75% of *E. pelinophilum* habitat is within private ownership with few protections (see 2.3.1.5) (USFWS, pers. comm., 2009, slide 13). Development around the communities of Delta and Montrose is expected to continue with an increasing population. Given the population increase and the proportion of the habitat already affected by development the imminence of this threat is moderate to high. Every EO is subject to development pressure, although those sites either on public lands or protected by a conservation easements are less vulnerable (see 2.3.2.4 below). Therefore, the magnitude of this threat is high. If the species were removed from the list of threatened and endangered species, this threat would be of higher imminence and magnitude because those projects with Federal funding would not be as carefully considered, funding to protect occurrences on private land would not be available, and the species would not receive the attention and outreach it does today.

Off-Road Vehicle Use: Aside from the direct loss of *Eriogonum pelinophilum* individuals, cars, motorcycles, and ORVs (collectively ORVs) may impact *E. pelinophilum* habitat in several ways. One common effect is soil compaction, which diminishes water infiltration, destroys soil stabilizers, and increases erosion from water and wind (ORV effects summarized in Ouren et al. 2007, pp. 1-225). Because of decreased soil moisture and increased compaction, plant size is generally reduced. Soil compaction also increases the potential for invasive, nonnative annuals and other early successional plants to establish rapidly in ORV routes. Other impacts such as edge effects, fragmentation, and dust impacts occur from ORV use. The Mancos shale soils are vulnerable to ORV impacts because the clay is especially vulnerable to compaction (see 2.3.1.6 above) and because there are no rocks and little vegetation to resist erosion.

The ORVs are required to be registered in the State of Colorado. From 1991 to 2006, ORV registrations increased 937% (from 11,744 to 109,994), with an average annual increase of 16% (Summit County Off Road Riders 2009, p. 1). Impacts to *Eriogonum pelinophilum* from ORV use are expected to continue in all areas because of the difficulties associated with managing this dispersed recreation and because of its increasing popularity. *E. pelinophilum* habitat is sparsely vegetated and the existing vegetation is short, providing no barriers to ORV use.

The ORV use is occurring across the range of *Eriogonum pelinophilum*. Private lands not fenced or posted with no trespassing signs are being used by ORVs. For example, one portion of EO 001 was documented as being largely destroyed by ORV use in 2001 (Reveal 2006, p. 1). Other EOs on private land where ORV use has been documented include 003, 007, and 025.

On BLM lands within the GGNCA, travel is limited to designated routes only, except within open ORV areas where no *Eriogonum pelinophilum* plants are known (GGNCA RMP 2004). On BLM lands outside the GGNCA, managed by the Uncompahgre Field Office, no restrictions on ORV use exist within areas occupied by *E. pelinophilum*. However, the Uncompahgre Field Office is in the process of limiting ORV travel to routes that were in existence on or before 2005 across areas that include the remaining *E. pelinophilum* habitat on public lands (BLM 2009a, pp. 1-27).

Although ORV use is limited to designated routes within the GGNCA, trespass ORV use has been documented at several *Eriogonum pelinophilum* EOs (003, 007, 014, and 025) (USFWS 2009a, Table 2). EO-025, the Selig Canal, is in an area where ORV use is reported to have escalated in the past several years (Ferguson, in litt., 2009, p. 2). Because of this trespass use, the private landowner in the area (on a Black Canyon Land Trust conservation easement) is working toward erecting a fence on the property (Ferguson, in litt., 2009, p. 2). EO-011 at the Fairview North ACEC was fenced in 2008, in part, to prevent further trespass ORV use. The ORV use also has been documented on the Uncompahgre Field Office at EOs 012 and 018 where it is currently allowed (USFWS 2009a, Table 2).

Eriogonum pelinophilum is a long-lived perennial. We do not have good data, but recruitment appears to be sporadic and infrequent, numerous seedlings have been reported in only one study (Lyon 2008, appendix 1). These characteristics make recovery after ORV use long-term or unlikely. Plants are found only on roads with infrequent use and are absent from more well travelled routes (BLM 2009a, p. 22). The use of ORVs will soon be limited to travel on existing routes on public lands across the

range of the species. However, use on private lands is not limited (except for those few sites with conservation easements) and trespass use continues to escalate with limited enforcement.

Because ORV use is currently limited in scope, based on field visits we estimate tire tracks affect less that 2% of *Eriogonum pelinophilum* habitat, we find the magnitude of this threat to currently be low. The ORV use is difficult because a few users atop *E. pelinophilum* populations could quickly increase the magnitude of the threat. Because of the potential for impact and because ORV use is dramatically increasing we find the imminence of this threat to be high. If the species were removed from the list of threatened and endangered species, this threat would be of higher imminence and magnitude because travel restrictions would likely not be implemented and enforced at lower levels than today.

Nonnative Invasive Plants: Invasive nonnative plants (weeds) invade and alter all types of plant communities, often resulting in nonnative plant monocultures that support little wildlife or native plants. Many experts believe that, following habitat destruction, invasive nonnative plants are the next greatest threat to biodiversity (Randall 1996, pp. 370-383). Nonnative invasive plants alter different ecosystem attributes including geomorphology, fire regime, hydrology, microclimate, nutrient cycling, and productivity (Dukes and Mooney 2004, pp. 411-437). Invasive nonnative plants also can detrimentally affect native plants through competitive exclusion, altered pollinator behaviors, niche displacement, hybridization, and changes in insect predation. Examples are widespread among taxa and locations or ecosystems (D'Antonio and Vitousek 1992, pp. 63-87; Olson 1999, pp. 6-18; Mooney and Cleland 2001, pp. 5446-5451).

Nonnative species documented within or adjacent to *Eriogonum pelinophilum* EOs include: *Acroptilon repens* (Russian knapweed), *Alyssum parviflorum* or *A. simplex* (alyssum), *Bromus inermis* (smooth brome), *Bromus tectorum* (cheatgrass), *Cardaria draba* (whitetop or hoary cress), *Cardaria pubescens* (hairy whitetop), *Ceratocephala testiculata* (bur buttercup, hornhead, or curveseed butterwort), *Chorispora tenella* (blue mustard or crossflower), *Cirsium arvense* (Canada thistle), *Descurainia* sp. (tansymustard), *Elaeagnus angustifolia* (Russian olive), *Erodium cicutarium* (storksbill or redstem filaree), *Erysimum repandum* (spreading wallflower), *Halogeton glomeratus* (halogeton or saltlover), *Lactuca serriola* (prickly lettuce), *Lepidium perfoliatum* (clasping pepperweed), *Melilotus officinale* (yellow sweetclover), *Salsola tragus* (prickly Russian thistle), *Sisymbrium altissimum* (tall tumblemustard), *Traxacum officinale* (common dandelion) (CNHP 2009, pp. 1-81; USFWS 2009a, Table 2).

Russian olive is most likely associated with canals and other perennially wet areas. Russian knapweed, Canada thistle, and smooth brome are likely associated with moist areas and their margins, although this may not be apparent in areas where the water table is several feet below the infestation. Particularly problematic nonnatives include those with deep rhizomatous roots that are difficult to control such as Russian knapweed, Canada thistle, and whitetop; and those that are invading the swales and snowbank sites of *Eriogonum pelinophilum* such as cheatgrass, blue mustard, tall tumblemustard, and halogeton. Nonnatives have been documented at many *E. pelinophilum* EOs (001, 003, 011, 012, 014, 015, 018, 025, and 041) and are likely at all of the EOs (CNHP 2009, pp. 1-81; USFWS 2009b, Table 1). As an example, at several locations we have seen Russian knapweed infestations expanding into *E. pelinophilum* sites.

The impacts of these nonnative species to *Eriogonum pelinophilum* have not been researched. Given the habitat alterations generally attributed to nonnatives and the ubiquitous presence of nonnatives we expect impacts are occurring. We are unaware of any specific efforts to control nonnatives within *E. pelinophilum* habitat, although control of nonnatives is included in the GGNCA RMP and the management plan for Wacker Ranch.

Because *Eriogonum pelinophilum* is a long-lived perennial and was established before many of the nonnatives were introduced, impacts may not be immediate and would require longer term monitoring to quantify. The effects of annual nonnatives that are confined to moist pockets where *E. pelinophilum* resides (as opposed to annual nonnatives that blanket landscapes and can increase fire frequency) to a long lived perennial like is *E. pelinophilum* unknown. Therefore, we find the imminence of this threat to be low. Many of the most competitive nonnatives require water, making only small portions of *E. pelinophilum* sites susceptible to invasion by these species. However, nonnatives occur at all EOs. Therefore, we find the magnitude of this threat to be moderate to high. If the species were removed from the list of threatened and endangered species, this threat would be of similar imminence and magnitude since no active control is occurring.

Livestock Use: Threats related to livestock use include the eating of individual plants, physical effects of trampling of plants, and the indirect effects of habitat degradation. We are unaware of any research or monitoring that has evaluated the effects of livestock use on *Eriogonum pelinophilum*. However, the deleterious effects of livestock on western arid ecosystems are well documented (Milchunas et al. 1992, pp. 520-531; Jones 2000, pp. 155-164). Some of the adverse effects from livestock include changes in the timing and availability of pollinator food plants (Kearns and Inouye 1997, pp. 298-299); changes to insect communities

(Kearns and Inouye 1997, pp. 298-299; Debano 2006, pp. 2547-2564); changes in water infiltration due to soil compaction (Jones 2000, Table 1); disturbance to soil microbiotic crusts (Belnap et al. 1999, p. 167; Jones 2000, Table 1); subsequent weed invasions (Parker et al. 2006, pp. 1459-1461); and soil erosion from hoof action (Jones 2000, Table 1). We expect that at least some of these livestock use effects are occurring in *E. pelinophilum* habitat. For example, a livestock exclosure near EO-014 that has been in place for over 40 years contains biological crusts that are much denser than surrounding areas, to the point where this effect can be seen from satellite imagery. These crusts hold soil in place and slow erosion on the highly erosive soils where *E. pelinophilum* is found.

Livestock use has been documented at *Eriogonum pelinophilum* EOs 001, 003, 006, 011, 012, 013, 014, 018, 019, and 025, with heavy use documented at portions of EOs 001, 006, 014, 018, and 025 (CNHP 2009, pp. 1-81; summarized in USFWS 2009b, Table 1). Most livestock use is attributed to sheep and generally occurs in the winter and early spring when sheep are wintering in the lowlands. Opinions vary on the impacts of livestock use on *E. pelinophilum*. For example, one researcher has said that *E. pelinophilum* will withstand light grazing, provided there is no long term concentration of animals in the area (Reveal, in litt., 2001, p. 1). Another observer stated that half of the individual plants at a given site were extirpated by grazing (Peterson et al. 1983 in CNHP 2009, EO-001; USFWS 2009b, Table 1). Another observer stated there were plants on one side of a fence where there was no grazing and no plants on the side of the fence that had been grazed (Lyon 1998 in CNHP 2009, EO-012). Terracing from excessive livestock trailing and trampling has been noted at one EO (Neely and O'Kane 1985 in CNHP 2009, EO 014). In winter when the ground is frozen, ground disturbance from livestock is probably limited; however, when the ground thaws and is wet, trampling impacts do occur as was seen at the most numerous site (EO 018) in 2009 (Ewing and Glenne 2009d, pp. 1-8).

During the most extensive survey for the *Eriogonum pelinophilum* within the most numerous EO (018), minor impacts from livestock, especially from trampling near sheep bed grounds, were documented (Ferguson 2007, p. 2). Little browsing was found (Ferguson 2007, p. 2). Historical grazing may have benefited *E. pelinophilum* by reducing competition from other species (Ferguson 2007, p. 2). This study found that several associated species were heavily browsed and that perennial grasses that should be present were conspicuously absent (Ferguson 2007, p. 8).

At one location near sheep bedding grounds, *Eriogonum pelinophilum* plants were found on root pedestals, apparently due to the increased erosion in the area (Ferguson 2007, p. 8). All *E. pelinophilum* sites on BLM lands are grazed by livestock, except at the Fairview North ACEC

where a fence has been erected and livestock excluded. Grazing on the largest *E. pelinophilum* site (EO-018) limits use to 5 nights a year, and the BLM has agreed to conduct monitoring for the species at the site (BLM 2008a, p. 15). The monitoring is designed to track a downward trend in *E. pelinophilum* abundance, but does not include an ungrazed comparison (Mayo 2008, pp. 1-2). Livestock grazing is allowed within *E. pelinophilum* sites on the GGNCA, but we have few specifics of where or when grazing occurs (GGNCA RMP 2004, pp. 2-21 and 2-22).

During 2009, significant livestock impacts occurred within EO 018, the largest *Eriogonum pelinophilum* site containing over two thirds of the known individuals. Extensive trampling (Ewing and Glenne 2009d, pp. 1-8; Sharp, in litt. 2009, T1 and T2 pictures) and grazing of individual plants (Sharp, in litt. 2009, T1 and T2 pictures) was documented. Monitoring at four transects to assess livestock use at EO 018 was initiated in 2008 and was again conducted in 2009. All transects are used by livestock. A general decrease in the size of individuals occurred between these 2 years. Additionally, a minimal decrease in the number of mature, adult, and immature plants (from 953 individuals in 2008 to 936 individuals in 2009) and a significant reduction in the number of seedlings (2791 seedlings in 2008 and 171 individuals in 2009) was documented (BLM 2008b, Tables T1-T4; BLM 2009b, Tables T1-T4; USFWS 2009c, Table and Graph). Unfortunately, we do not have any ungrazed transects for comparison with grazed transects, we do not understand yearly variations in *E. pelinophilum* counts, nor do we understand germination and seedling patterns for *E. pelinophilum* well enough to accurately assess the effects of this livestock use. However, the general decrease in the size of individuals could be a result of plants being browsed and some seedlings could have been lost to livestock trampling.

Livestock use, primarily winter use by sheep, occurs on public lands at all *Eriogonum pelinophilum* EOs except a portion of EO-011 (Fairview North) that has been fenced and where livestock have been excluded. Livestock use is limited on private land conservation easements. Because many of the private land EOs are not fenced from public lands, we expect these sites also may have some livestock impacts. Some private land sites also have livestock use from resident animals. Therefore, we find the magnitude of the threat from livestock to be moderate to high. We do not have counts of *E. pelinophilum* individuals from before livestock were introduced (to understand overall trends), we do not have comparison counts from any grazed versus ungrazed areas, nor do we have any research quantifying the effects of livestock. Some impacts through browsing, habitat degradation, erosion, trampling, and possibly seedling removal are occurring. Plants remain at sites impacted by some livestock use, although we do not understand the overall trend in numbers of individuals or habitat quality. Therefore, we find the imminence of this

threat to be moderate to low. If the species were removed from the list of threatened and endangered species, this threat would be of higher imminence and magnitude because the plant and associated livestock grazing would likely not be monitored as carefully.

Oil and Gas Development: Oil and gas development is common in western Colorado; however, we are unaware of any impacts to *Eriogonum pelinophilum*. We do not know what the threat of this development may be in the future. After 2004, lands within the GGNCA were withdrawn from future oil and gas leasing (GGNCA RMP 2004, Appendix E). The Uncompahgre Field Office RMP designates ACEC lands as open to Federal leasing, but with a no surface occupancy stipulation (Ferguson, in litt., 2006, p. 3). We find the imminence and magnitude of this threat to be low. If the species were removed from the list of threatened and endangered species, this threat could be of higher imminence and magnitude if oil and gas development became more prevalent in the area.

Herbicide Use: Herbicide use has been documented as a potential threat to *Eriogonum pelinophilum* (BLM 2009a, p. 20). We are unaware of any instances where herbicide use has impacted *E. pelinophilum.* However, the proximity of *E. pelinophilum* to agricultural fields and nonnative species makes the species vulnerable to this impact. At this time we find the imminence and magnitude of this threat to be low.

Summary: Increasing development continues to fragment and impact *Eriogonum pelinophilum* and its habitat (Figures 3 and 4). This development includes residential and industrial buildings, agricultural fields, power lines, canals, roads, ORV use, and nonnative invasive plants. At least two populations (EOs 004 and 006) are completely surrounded by development and of very limited aerial extent. This isolation and small population size suggests that a loss of genetic variation, genetic drift, or inbreeding may be possible at these two EOs as well as other EOs with adjacent development, thereby reducing the resiliency of these populations (Ellstrand and Elam 1993, pp. 217-242).

We estimate that roughly 40% of *Eriogonum pelinophilum* habitat has already been impacted by buildings or agricultural fields (USFWS, pers. comm., 2009, slide 11). Almost 75% of *E. pelinophilum* habitat is within private ownership with few protections (see 2.3.1.5) (USFWS, pers. comm., 2009, slide 13). Development around the communities of Delta and Montrose is expected to continue. Furthermore, ORV use is on the rise in the area and is increasingly impacting *E. pelinophilum* and its habitat. Impacts from 2009 suggest that livestock use may pose a threat to the largest *E. pelinophilum* population. Table 3 below summarizes the primary impacts from destruction, modification, or curtailment of *E. pelinophilum* habitat.

TABLE 3. Known threats from destruction and modification or curtailment of habitat at *Eriogonum pelinophilum* EOs (USFWS 2009a, Table 2). The letter H indicates a "historic" threat that is known to be no longer occurring, in this case because a fence has been erected.

EO Number	Population	Adjacent Development	Development On Site	Future Development	Nonnatives	Livestock	Off-Road Vehicles	Land Management with Rough Estimates of Ownership Percentage
001	Lawhead Gulch	x	x	x	x	x	x	private
003	North Selig Canal	x	x	x	x	x	x	33% BLM- 66% private
004	Olathe South	x	x	x				private
006	North Mesa	x	x	x				private
007	Peach Valley	x	x	x				private
011	North Fairview	x	x	x	x	H	H	50% BLM - 50% private
012	Sunshine Road	x	x	x	x	x	x	5% BLM – 95% private
013	Cedar Creek		x	x		x		private
014	Candy Lane/Peach Valley	x	x		x	x		BLM
015	Selig Canal 3		x	x	x			private
016	Dry Cedar Creek	x		x				BLM
017	Oak Grove Road	x		x				private
018	Wacker Ranch/Fairview South	x		x	x	x	x	70% BLM – 20% Colorado State (CNAP) – 10% private
019	Star Nelson Airport	x		x		x		private
021	Montrose East	x		x				private
022	Montrose East			x				private
023	Hotchkiss							unknown
024	Montrose Northeast	x		x				private
025	Selig Canal		x	x	x	x	x	90% BLM – 10% private
041	Garret Ditch	x	x	x	x			66% BLM – 33% private
New 1	Peach Valley North		x	x				33% BLM – 66% private
New 2	Loutsenhizer Canal		x	x				BLM

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes: None included in the final listing rule or the recovery plan. None known at this time.

2.3.2.3 Disease or predation: No disease or predation is described in the final listing rule for *Eriogonum pelinophilum*, livestock grazing is briefly discussed in the recovery plan. Tent caterpillar impacts to *E. pelinophilum* were noted in 2007 (Ferguson 2007, p. 6). Herbivory where several plants were heavily browsed has been documented in two instances, but the herbivore is unknown and the number of individuals impacted was low (Ferguson 2007, p. 7). Herbivory of numerous individuals was documented associated with livestock use in 2009; although, this use has not yet been well quantified (Sharp, in litt. 2009, T1 and T2 pictures). Herbivory by livestock is addressed under "livestock use" above. No other disease or predation has been noted. We find the imminence and magnitude of disease or predation to be low at this time.

2.3.2.4 Inadequacy of existing regulatory mechanisms: The final listing rule for *Eriogonum pelinophilum* discussed that *E. pelinophilum* is not protected under any Colorado law (49 FR 28562). The recovery plan for *E. pelinophilum* discusses that sites on public land are not subject to farming or housing developments, but are still vulnerable to right-of-way development and unregulated ORV use (USFWS 1988, p. 4).

Eriogonum pelinophilum has been protected under the Act since 1984 (49 FR 28562). This protection has resulted in increased funding, survey, monitoring, and research efforts; the establishment of two BLM ACECs and associated Colorado Natural Areas; the establishment of four conservation easements on private lands; the acquisition of one private parcel of land (the Wacker Ranch); considerations in BLM RMPs and processes; and protection through section 7 consultations on Federal lands or associated with Federal projects. It also has been granted some considerations by local governments in their planning processes.

Federal: If *Eriogonum pelinophilum* was removed from the list of threatened and endangered species, it would no longer be afforded the protections of section 7 of the Act. Federal agencies, in this case the BLM, would no longer consult with the Service on actions that could affect *E. pelinophilum*. If delisted, the species would be moved to the BLM's sensitive species list for 5 years and be protected under the guidelines of their Manual 6840 – Special Status Species Management (BLM 2008c). Experience with other sensitive species managed by the BLM has found widely different conservation scenarios.

The BLM's Fairview ACECs, both north and south, were designated within the Uncompahgre Field Office RMP process to manage and protect *Eriogonum pelinophilum* (Ferguson, in litt., 2006, pp. 1-6). The Fairview North ACEC has been fenced and livestock use has been halted and it was incorporated into the GGNCA RMP specifically to be retained and managed for the protection of *E. pelinophilum.* The two ACECs represent about 3% of the total suitable habitat for *E. pelinophilum*, but contain at least a third of all the counted individuals. We expect these ACECs would be retained if *E. pelinophilum* was removed from the list of threatened and endangered species. Both Fairview ACECs also are designated as Colorado Natural Areas. The CNAP has provided qualitative monitoring, quantitative monitoring, and management recommendations at both ACECs (Kurzel, in litt., 2008, pp. 1-4). This support from CNAP would likely continue if staff was available, although this can be dependent on the State of Colorado's budget and priorities.

The GGNCA RMP was completed in 2004. Management guidelines and prescriptions differ between various areas within the GGNCA RMP. Within the GGNCA RMP, almost all of the *Eriogonum pelinophilum* sites

fall within "other public lands" area except the New 2 populations which falls within the Flat Top – Peach Valley ORV Recreation Area (GGNCA RMP 2004, Figure 2-1). The GGNCA RMP specifically addresses *E. pelinophilum* and more specifically survey, monitoring, and research specific to the species in the general prescriptions for the entire GGNCA RMP (GGNCA RMP 2004, pp. 2-20). The BLM's Uncompahgre Field Office is in the process of revising its 1989 RMP. The 1989 RMP has few specifics for *E. pelinophilum* (Ferguson, in litt., 2006, p. 2), and would not constitute an adequate regulatory mechanism if *E. pelinophilum* was not listed. The majority of all known *E. pelinophilum* individuals fall within the BLM's Uncompahgre Field Office resource area and so are not adequately protected. Protections provided by the RMPs are included in the other threat discussions above.

State: The State of Colorado has no laws protecting rare plant species. Plants also are not included in the Colorado Wildlife Action Plan and so do not qualify for funding under State Wildlife Grants. The State of Colorado does have a Natural Areas Program that works to protect special resources in the state. *Eriogonum pelinophilum* is afforded some monitoring and efforts at both ACECs and Wacker Ranch in association with this program.

Eriogonum pelinophilum occurs on State lands only at Wacker Ranch. Wacker Ranch was acquired through a USFWS Recovery Land Acquisition Grant in 2007 to protect *E. pelinophilum* (McGillivary, in litt., 2007, p. 1). The property is owned by the Colorado Division of Parks and Outdoor Recreation (Colorado Natural Areas), is a Colorado Natural Area, and is managed by The Nature Conservancy (Colorado Division of Parks and Outdoor Recreation and The Nature Conservancy 2007, pp. 1-5). A formal management plan has been completed and nonnative weed control, qualitative and quantitative monitoring, as well as public outreach is ongoing for this property (Kurzel, in litt., 2008, pp. 1-4). This easement constitutes an adequate regulatory mechanism for this site; however, this site has little influence over the stability of the species as a whole as it only accounts for roughly 20% of the individuals of this one occurrence.

Private: Overall, *Eriogonum pelinophilum* is provided little protection on private lands. Neither the cities of Delta or Montrose nor the counties of Delta or Montrose have guidelines, zoning, or other mechanisms to protect the species. Little outreach or education has occurred encouraging private landowners to conserve *E. pelinophilum*. Projects that occur on private land currently require Section 7 consultation under the Act only where there is Federal funding or a Federal agency authorization, such as the lining of canals. If *E. pelinophilum* was removed from the list of threatened and endangered species, this Section 7 requirement would no longer exist and, therefore, the species would have no legal protection on

private lands. Furthermore, private landowners with species listed under the Act on their properties would no longer qualify for available funding opportunities.

Conservation Easements on Private Land: Four conservation easements held by the Black Canyon Lands Trust total 1,160 ac (469 ha) of which 600 ac (243 ha) is considered *Eriogonum pelinophilum* habitat, or roughly 5% of *E. pelinophilum*'s total habitat and 6% of the private lands. These easements provide protection at 64% of EO 001 and about 10% of EO 025. Easements held by the Black Canyon Land Trust provide permanent protection for *E. pelinophilum*. The easements prohibit livestock use, ORV use, development, fence construction through occupied habitat, and habitat alteration in *E. pelinophilum* areas (Hatch, in litt., 2009, pp. 1-2). They are not actively managed for *E. pelinophilum* and have only partially been surveyed for *E. pelinophilum*, although the presence of the plant has been confirmed on all easements (Hawke, in litt., 2009, pp. 1-2). Efforts are underway to fence around one of the easements at EO 025.

Summary: Almost 75% of *Eriogonum pelinophilum* habitat is within private ownership (see 2.3.1.5) (USFWS, pers. comm., 2009, slide 13). Only 6% of these private lands are afforded some sort of protection through conservation easements overseen by the Black Canyon Land Trust. In addition, little outreach has been conducted to protect *E. pelinophilum* on the remaining private lands.

Sites on Federal land are protected through Section 7 of the Act and through protective measures of ACECs and the GGNCA. Legitimate and trespass ORV, right-of-ways, and livestock use are still occurring on these Federal lands.

Because such a high proportion of the species' habitat is on private lands, with no protections, we find the current lack of regulatory mechanisms to pose a high degree of threat to the species. Because development would constitute the primary threat to these private lands, we find the imminence of this threat to be high. If the species were removed from the list of threatened and endangered species, this threat would be of higher imminence and magnitude.

2.3.2.5 Other natural or manmade factors affecting its continued existence: No other factors are discussed in either the final listing rule or the recovery plan for *Eriogonum pelinophilum*.

Climate change could potentially impact *Eriogonum pelinophilum*. According to the Intergovernmental Panel on Climate Change (IPCC), "Warming of the climate system in recent decades is unequivocal, as is

now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global sea level" (IPCC 2007, p. 1). Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1,300 years (IPCC 2007, p. 30). Over the past 50 years cold days, cold nights, and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent. Heat waves have become more frequent over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007, p. 30).

For the southwestern region of the United States, including western Colorado, warming is occurring more rapidly than elsewhere in the country (1.5°F [0.8°C] since 1979), causing declines in winter snowpack and the Colorado River's flow (Karl et al. 2009, p. 129). Under lower emission scenarios temperature is expected to increase 5°F (2.8°C) and under higher emission scenarios temperature is expected to increase 10°F (5.6°C) by the end of the century, from the 1979 baseline (Karl et al. 2009, p. 29). Under high emission scenarios the number of days over 90°F could double by the end of the century (Karl et al. 2009, p. 34). To date, precipitation has increased roughly 10% from 1958 to 2008 where *Eriogonum pelinophilum* resides (Karl et al. 2009, p. 30). However, southern areas, especially the Southwest are expected to suffer significant reductions in winter and spring precipitation (Karl et al. 2009, p. 30).

Future projections for the southwest predict increased temperatures, more intense and longer-lasting heat waves, an increased probability of drought that are worsened by higher temperatures, heavier downpours, increased flooding, and increased erosion (Karl et al. 2009, pp. 129-134). These changes will affect fire frequency, community assemblages, and the ability of nonnative species to succeed. We do not understand exactly what impact these projected climate changes will have on *Eriogonum pelinophilum*. The drought in 1998 was implicated in a general lack of flowers that year (CNHP 2009, pp. 1-81). A lack of precipitation during the growing and flowering season could significantly impact reproduction. The Mancos shale is limited in distribution and the plant is a long-lived perennial, both factors will limit *E. pelinophilum*'s ability to migrate with a changing climate.

Climate change likely is and will affect all *Eriogonum pelinophilum* populations. We expect the effects will generally be negative, but the imminence and severity of these effects are currently difficult to assess. Maintaining the species as a listed entity under the Act may lead to further monitoring efforts such that effects will be more measureable over time.

2.4 Synthesis: Our understanding of the biology and distribution of *Eriogonum pelinophilum* has improved greatly since the species was first listed in 1984. The overall range of the species is roughly what it was when the recovery plan was written in 1988; however, several populations have expanded, the estimated number of individuals has increased significantly, and some new populations have been discovered. These increases in the number of individuals, expansions, and new discoveries are a result of increased survey effort, not an expansion of the species. We make this assumption because the species is long-lived and because populations appear to occupy roughly the same areas they have for the last 30 years. We now know that the species is reliant on pollinators for reproduction and is an outcrossing (exchanging genetic material with other plants) species. This trait makes habitat fragmentation of greater concern, affecting genetic diversity and the species' ability to withstand disturbances.

The threats the species faced in 1984 were described as development of the private land and horse grazing pressures. These threats still exist today, but are compounded by rapid human population growth in the Delta and Montrose areas. Several other threats are now known including increased development, an increase in ORV use, further livestock use, and nonnative invasive plants. We estimate that roughly 40% of *Eriogonum pelinophilum* habitat has already been impacted by buildings or agricultural fields (USFWS, pers. comm., 2009, slide 11). Almost 75% of *E. pelinophilum* habitat is within private ownership with few protections (USFWS, pers. comm., 2009, slide 13).

An endangered species is defined as "any species which is in danger of extinction throughout all or a significant portion of its range." Because the species is facing an increasing pressure from human population growth, because of the newly identified threats, and because of the high proportion of the *Eriogonum pelinophilum* population that is on private lands with no protections, we recommend the species remain designated as endangered under Act.

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X__ No change is needed

0.2. New Recovery Priority Number: 8c. This indicates that (1) populations face a moderate degree of threat; (2) recovery potential is high; (3) the entity is listed at the species level; and (4) the species is in conflict with construction or other development projects or other forms of economic activity.

Brief Rationale: This change in recovery priority number is based on the degree of threat. Our official guidance (48 FR 43098) defines the high threat category as "extinction is almost certain in the immediate future because of a rapid population decline or habitat destruction" and moderate as "the species will not face extinction if recovery is temporarily held off, although there is continual population decline or threat to its habitat." We believe the species is not in immediate danger, but that there is continual population decline and threat to *Eriogonum pelinophilum*'s habitat.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Threat Abatement

1. Permanently protect all occupied habitat. On public lands, add additional and expand existing ACECs, remove threats (especially ORV activity and negative impacts from livestock use), and provide more stringent protection within RMPs. On private land, pursue conservation easements, appropriate zoning incentives, and land acquisitions to protect populations.

2. Coordinate with local governments to better protect *Eriogonum pelinophilum*. Consider lower densities for new developments, open space, avoidance measures, and other actions to conserve the species. Integrate these actions into county and city land use planning designations.

3. Conduct education and outreach efforts for the public. The intent of these efforts will be to secure more *Eriogonum pelinophilum* sites for conservation. Develop and implement permanent conservation agreements and easements for populations on private lands. Provide technical and financial support for conservations actions on private lands.

4. Work with all parties to prevent ORV use within *Eriogonum pelinophilum* habitat.

5. Consider removing livestock from all *Eriogonum pelinophilum* sites. If livestock use continues, careful monitoring of the species and the livestock use should occur. Research (see below) assessing the effects of livestock use should be conducted.

6. Conduct nonnative invasive plant control activities where needed to conserve *Eriogonum pelinophilum*. Control should be conducted with extreme care to reduce impacts to *E. pelinophilum*.

7. Recommend at least a 200 m/656 ft buffer between occupied or suitable habitat and ground disturbance or other activities that may affect *Eriogonum pelinophilum* or its habitat.

Administrative Actions

1. Revise the recovery plan for *Eriogonum pelinophilum* so that it reflects the best scientific and commercial information available. The revised recovery plan should include objective, measurable criteria which, when met, will result in a determination that the species be removed from the Federal List of Endangered and Threatened Plants. Recovery criteria should address all threats impacting the species. The recovery plan also should estimate the time required and the cost to carry out those measures needed to achieve the goal for recovery and delisting.

2. Revise critical habitat for *Eriogonum pelinophilum*. "Critical habitat" is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. We expect to publish a 12-month finding on a petition to revise critical habitat by September of 2009.

3. Develop and implement consistent conservation measures in the Uncompahgre Field Office's RMP revision that will avoid and minimize impacts to *Eriogonum pelinophilum* from all development, ORV, and grazing activities. Include protection for all occupied and suitable habitat in the conservation measures.

4. Expand existing ACECs to include contiguous occupied and suitable habitat for the plant and its pollinators. Revise ACEC management guidelines to better protect *Eriogonum pelinophilum*. Consider creating new ACECs to conserve the species, especially in the northern portion of the species' range near the Selig Canal sites (EOs 014 and 025) and unsurveyed land in the area.

Surveys and Monitoring

1. Inventory potential habitat for *Eriogonum pelinophilum* on public and private lands. Report results to CNHP, BLM, and the Service. These surveys will provide better information to guide recovery and conservation actions as well as project planning.

2. Initiate range-wide trend monitoring to track the health of *Eriogonum pelinophilum*. Include a component to analyze potential effects from disturbances, nonnatives, and climate change.

3. Monitor the effects of development activities located within 200 m/656 ft of plant populations on plants, pollinators, and habitat. Change buffers as determined by monitoring results.

4. Conduct demographic monitoring that determines critical life history stages that will enhance management of the species.

Research

1. Conduct research studying demographic parameters that identifies critical life history stages.

2. Conduct research studying genetic diversity and taxonomic relations of *Eriogonum pelinophilum.* This research should address what populations are most important to conserve and investigate if genetic diversity is a problem for small isolated populations.

3. Conduct research investigating the effects of various threats. For example, impacts of various levels of livestock use, the impacts of ORVs, the impacts of nonnative species, and the effects of various disturbance levels.

4. Incorporate demographic, genetic diversity, and threat research into a population viability analysis that addresses minimum population size, and trajectories factoring in effects of threats.

5.0 REFERENCES

Bates, B.C., Z.W. Kundzewicz, S. Wu, and J.P. Palutikof, Eds. 2008. Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva. 210 pp.

Belnap, J., J. Williams, and J. Kaltenecker. 1999. Structure and function of biological soil crusts. *In* Pacific Northwest Forest and Rangeland Soil Organism Symposium. Produced by the Pacific Northwest Research Station. General Technical Report PNW-GTR-1999. Pages 161-178.

BIO-Logic Environmental. 2004. Biological survey report 2004: Tri-State Generation and Transmission Association, Inc. Spring Creek – Hotchkiss 115kV transmission line. Unpublished report prepared November 30, 2004. 17 pp. + appendices.

BIO-Logic Incorporated. 2008. Delta-Montrose Electric Association and Tri-State Generation and Transmission Association, Incorporated. East Montrose electric system improvement project, biological survey report: 2008 Field Surveys. Unpublished report prepared August 27, 2008 and submitted to View Point West. 4 pp. + figures.

Bowlin, W.R., V.J. Tepedino, and T.L. Griswold. 1992. The reproductive biology of *Eriogonum pelinophilum* (Polygonaceae). Southwestern Rare and Endangered Plants: 296-302.

Bureau of Land Management. 2008a. Environmental Assessment: Colona LHA grazing permit renewals. Number CO-150-2008-16EA. 20 pp.

Bureau of Land Management. 2008b. Tables with *Eriogonum pelinophilum* monitoring data for 2008. Received July 30, 2009. 28 pp.

Bureau of Land Management. 2008c. Manual 6840 special status species management (public). Revised December 12, 2008. 48 pp.

Bureau of Land Management. 2009a. Biological assessment for federally protected species and designated critical habitat for an amendment to the Uncompahgre Basin and San Juan – San Miguel Resource Management Plans: Limiting motorized and mechanized travel to existing routes. Prepared May 12, 2009. 41 pp.

Bureau of Land Management. 2009b. Tables with *Eriogonum pelinophilum* monitoring data for 2009. Received August 3, 2009. 28 pp.

Bureau of Reclamation. 1994. Lower Gunnison Basin Unit East Side Laterals, Colorado River Water Quality Improvement Program, supplement to the feasibility Report. September 1994. 53 pp.

Carpenter, A., and T. Schultz. 1994. Population dynamics, growth and reproduction of the clay-loving wild buckwheat (*Eriogonum pelinophilum*) at Wacker Ranch in Montrose County, Colorado. Unpublished report prepared by The Nature Conservancy. 4 pp.

CensusScope. 2009. Colorado counties ranked by rate of population growth (1990-2000) and Montrose County Population Growth (1960-2000). Accessed online at httpe://www.censusscope.org/us/s8/print rank popl growth.html on June 30, 2009.

Center for Native Ecosystems, Colorado Native Plant Society, and Uncompahgre Valley Association. 2006. Petition to amend the critical habitat designation for the clay-loving wild buckwheat (*Eriogonum pelinophilum*) made under the endangered species act (16 U.S.C. § 1531, et seq.). Dated July 17, 2006 and received July 24, 2006. 38 pp. + appendices.

Coles, J. 2006. Monitoring protocol for *Eriogonum pelinophilum*. Unpublished report prepared by NatureServe February 16, 2006. 11 pp.

Colorado Division of Parks and Outdoor Recreation and The Nature Conservancy. 2007. Memorandum of Agreement for management of Wacker Ranch. March 27, 2007. 12 pp.

Colorado Natural Areas Program. 1986. Program narrative: life history characteristics and habitat requirements for *Eriogonum pelinophilum* and protection of known populations. Unpublished report. 5 pp.

Colorado Natural Areas Program. 1987. Life history characteristic and habitat requirements for *Eriogonum pelinophilum* (clay-loving buckwheat – threatened): 1987 performance report. Unpublished report. 9 pp.

Colorado Natural Heritage Program. 2006. *Eriogonum pelinophilum*; an Endangered Species. Unpublished report. 5 pp.

Colorado Natural Heritage Program. 2007. Element global rank report for *Eriogonum pelinophilum*. Unpublished report printed May 10, 2007. 6 pp.

Colorado Natural Heritage Program. 2009. *Eriogonum pelinophilum* Element Occurrence Records and spatial database. 81 pp. + GIS shapefiles.

Colorado State Demography Office. 2008. Population Estimates for Colorado Counties (2000-2007). Table 3 prepared by the State Demography Office in November 2008. Accessed online at http://www.dola.state.co.us/dlg/demog/pop_cnty_estimates.html on February 2, 2009. 3 pp.

D'Antonio, C.M., and P.M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecological Systematics 23:63-87.

Debano, S.J. 2006. Effects of livestock grazing on aboveground insect communities in semi-arid grasslands of southeastern Arizona. Biodiversity and Conservation 15:2547-2564.

Delta-Montrose Electric Association and Tri-State Generation and Transmission Association, Inc. 2009. East Montrose electric system improvement project information and updates. Letters and maps from various 2008 and 2009 dates. 5 pp.

Dudley, S.C. 2009. The first five: A brief history of the Uncompahgre Project (Gunnison). Accessed online at www.waterhistory.org on July 10, 2009. 3 pp.

Dukes, J.S., and H.A. Mooney. 2004. Disruption of ecosystem processes in western North America by invasive species. Revista Chilena de Historia Natural 77:411-437.

Ellstrand, N.C., and D.R. Elam. 1993. Population genetic consequences of small population size: Implications for plant conservation. Annual Review of Ecology and Systematics 24:217-242.

Ewing, C., and G. Glenne. 2009a. Colorado Natural Heritage Program Plant Element Occurrence Field Form, map, and photos from *Eriogonum pelinophilum* Element Occurrences 004, 006, and 024. Unpublished form from February 12, 2009. 15 pp.

Ewing, C., and G. Glenne. 2009b. Colorado Natural Heritage Program Plant Element Occurrence Field Form, map, and photos from *Eriogonum pelinophilum* Element Occurrence 025. Unpublished form from February 12, 2009. 9 pp.

Ewing, C., and G. Glenne. 2009c. Colorado Natural Heritage Program Plant Element Occurrence Field Form, map, and photos from *Eriogonum pelinophilum* Element Occurrence 003. Unpublished form from February 12, 2009. 9 pp.

Ewing, C., and G. Glenne. 2009d. Colorado Natural Heritage Program Plant Element Occurrence Field Form, map, and photos from *Eriogonum pelinophilum* Element Occurrence 018. Unpublished form from February 12, 2009. 9 pp.

Ferguson, J.R. 2007. Summer 2007 clay-loving wild buckwheat (*Eriogonum pelinophilum*) field surveys, including an assessment of the potential effects of livestock grazing on this species within the Colona LHA. Unpublished report compiled for the Bureau of Land Management, Uncompahgre Field Office. 12 pp. + appendices.

Gelbhard, J.L., and J. Belnap. 2003. Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology 17:420-432.

Gunnison Gorge National Conservation Area. 2004. Gunnison Gorge National Conservation Area approved resource management plan. November 2004. 180 pp. + appendices.

Intergovernmental Panel on Climate Change. 2007. Climate Change 2007: Synthesis Report. An Assessment of the Intergovernmental Panel on Climate Change. 52 pp.

Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. Western North American Naturalist 60:155-164.

Karl, T.R., J.M. Melillo, and T.C. Peterson [eds]. 2009. Global Climate Change Impacts in the United States. Cambridge University Press. 196 pp.

Kearns, C.A., and D.W. Inouye. 1997. Pollinators, flowering plants, and conservation biology. BioScience 47:297-304.

Lyon, P. 2008. Monitoring of *Eriogonum pelinophilum* at the Wacker Ranch Montrose, Colorado. Unpublished report prepared by the Colorado natural Heritage Program June 2008. 4 pp. + appendices.

Mayo, E. 2008. Draft monitoring protocol for the effects of livestock grazing on *Eriogonum pelinophilum* for the BLM Colona grazing permit renewal. Meeting notes from August 4, 2008. 2 pp.

Milchunas, D.G., W.K. Lauenroth, and P.L. Chapman. 1992. Plant Competition, Abiotic, and Long- and Short-Term Effects of Large Herbivores on Demography of Opportunistic Species in a Semiarid Grassland. Oecologia 92:520-531.

Mooney, H.A., and E.E. Cleland. 2001. The evolutionary impact of invasive species. Proceedings of the National Academy of Sciences of USA. 98:5446-5451.

Natural Resource Conservation Service. 2006a. Soil_metadata_co677.txt. Metadata for the partial soil survey geographic (SSURGO) database for Ridgeway area, Colorado, parts of Delta, Gunnison, Montrose, and Ouray Counties. Created July 10, 2006. 18 pp.

Natural Resource Conservation Service. 2006b. Map unit descriptions for the Ridgeway area, Colorado, parts of Delta, Gunnison, Montrose, and Ouray Counties. Created July 10, 2006. 12 pp.

Natural Resource Conservation Service. 2008. Soil_metatdata_co679.txt. Metadata for the soil survey geographic (SSURGO) database for Paonia area, Colorado, parts of Delta, Gunnison, and Montrose Counties. Created January 31, 2008. 16pp.

NatureServe. 2008. Comprehensive report species – *Eriogonum pelinophilum*. Accessed on the internet January 22, 2009 at http://www.natureserve.org/explorer/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=157709&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=157709&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=157709. Updated October 10, 2008. 10 pp.

Olson, B.E. 1999. Impacts of noxious weeds on ecological and economic systems. *In* R.L. Sheley and J.K. Petroff [eds] Biology and Mnagement of Noxious Rangeland Weeds *pages* 6-18. Oregon State University Press, Corvallis, Oregon.

Ouren, D.S., C. Haas, C.P. Melcher, S.C. Stewart, P.D. Ponds, N.R. Sexton, L. Burris, T. Francher, and Z.H. Bowen. 2007. Environmental Effects of Off-Highway Vehicles on Bureau of Land Management Lands: A Literature Synthesis, Annotated Bibliographies, Extensive Bibliographies, and Internet Resources. Open-File Report 2007-1353 prepared by the U.S. Geological Survey. 225 pp.

Parker, J.D., D.E. Burkepile, and M.E. Hay. Opposing effects of native and exotic herbivores on plant invasions. Science 311:1459-1461.

Potter, L.D., R.S. Reynolds, and E.T. Louderbough. 1985. Mancos shale and plant community relationships: field observations. Journal of Arid Environments 9:137-145.

Randall, J.M. 1996. Weed control for the preservation of biodiversity. Weed Technology 10:370-383.

Reveal, J.L. 1969. A revision of the genus *Eriogonum* (Polygonaceae). Unpublished doctoral dissertation, Brigham Young University, Provo, Utah. Pages 75-76.

Reveal, J.L. 1973. A new subfruiticose *Eriogonum* (Polygonaceae) from western Colorado. Great Basin Naturalist 33:120-122.

Reveal, J.L. 2005a. Flora of North America, www. eFloras.org: *Eriogonum*. Accessed on the internet January 6, 2009 at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=112045. 3 pp.

Reveal, J.L. 2005b. Flora of North America, www.eFloras.org: 9. *Eriogonum pelinophilum*. Accessed on the internet February 2, 2009 at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250060457. 1 pp.

Reveal, J.L. 2005c. Flora of North America, www.eFloras.org: 9. *Eriogonum clavellatum*. Accessed on the internet February 13, 2009 at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250060220. 1 pp.

Reveal, J.L. 2006. On the status of *Eriogonum pelinophilum* Reveal (*Polygonaceae* Juss.:subf. *Eriogonoideae* Arn.). Unpublished summary from January 11, 2006. 7 pp.

RMHTE (Rocky Mountain Herbarium Threatened and Endangered). 1985. Element Occurrence Record. This record and map will become EO 019 in the Colorado Natural Heritage Program, documented June 25, 1985. 2 pp.

Soil Conservation Service. 1981. Soil survey of Paonia area, Colorado, parts of Delta, Gunnison, and Montrose Counties. 184 pp. + maps.

Southwest Regional Gap Analysis Project. 2004. 'Provisional' Southwest Regional Landcover Data for Delta and Montrose counties. GIS layers and metadata accessed online at: http://earth.gis.usu.edu/swgap/landcover_co.php on January 6, 2009.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, the U.S. Forest Service and the U.S. Fish and Wildlife Service by the Colorado Natural Heritage Program.

Stehr, M. 2007. Moving forward: City, county officials balance demands in responding to projected growth. Article from the Montrose Daily Press dated November 11, 2007. 1 pp.

Summit County Off Road Riders. 2009. OHV facts for Summit County and beyond. Accessed on the internet at http://www.scorr.org/files/facts.htm on July 10, 2009. 1 pp.

Tepedino, V. 2009. Clay-loving wild buckwheat (*Eriogonum pelinophilum*) in highly and lightly disturbed surroundings: comparative diversity of flower visitors and their importance in pollination.

U.S. Fish and Wildlife Service. 1988. Clay-Loving Wild-Buckwheat (*Eriogonum pelinophilum*) Recovery Plan. Prepared by Region 6, Denver, Colorado. November 10, 1988. 15 pp.

U.S. Fish and Wildlife Service. 2009a. Summary table of all *Eriogonum pelinophilum* element occurrence records and threats. Prepared February 6, 2009, by Gina Glenne, Grand Junction, CO. 2 Tables.

U.S. Fish and Wildlife Service. 2009b. Summary table of *Eriogonum pelinophilum* occurrences by soil type. Prepared May 7, 2009, by Dan Reinkensmeyer, Grand Junction, CO. 1 pp.

U.S. Fish and Wildlife Service. 2009c. Summary table and graph of the Bureau of Land Management's 2008 and 2009 monitoring the EO 018 in association with the Colona livestock allotments. Prepared August 6, 2009. 1 p.

Western Regional Climate Center. 2009a. Period of record monthly climate summary from 1/1/1900 to 12/31/1999. Accessed online at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?codelt on February 3, 2009. 2 pp.

Western Regional Climate Center. 2009b. Period of record monthly climate summary from 1/1/1900 to 12/31/2005. Accessed online at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?comont on February 3, 2009. 2 pp.

In litterum

Alexander, Ron B. 2009. Resident Engineer, Colorado Department of Transportation. Subject: The blading of EO 001. Email to Gina Glenne, USFWS, dated July 10, 2009. 3 pp.

Boyle, Steve. 2009. Principal and Senior Scientist, BIO-Logic, Inc. Subject: *Eriogonum pelinophilum* surveys done from 2004 to 2008 by BIO-logic Inc. Email to Gina Glenne, USFWS, dated February 3, 2009. 5 pp.

Ferguson, Jim. 2006. Biologist (now retired), Uncompahgre Field Office, Bureau of Land Management. Subject: Management of the Fairview Areas of Critical Environmental Concern with comments from Resource Management Plans. Letter to Pat Melhop dated May 4, 2006. 6 pp.

Ferguson, Jim. 2009. President, Montrose Model Aircraft Association. Subject: Increased OHV use at the model airplane club and wanting to do fencing at the site. Email to Gina Glenne, USFWS, dated July 7, 2009. 2 pp.

Grauch, Richard I. 2009. Soil Scientist, U.S. Geological Survey. Subject: Soil studies for *Eriogonum pelinophilum.* Email to Gina Glenne, USFWS, dated May 20, 2009. 4 pp.

Hatch, Shannon. 2009. Land Steward, Black Canyon Land Trust. Subject: *Eriogonum pelinophilum* conservation easement permitted uses and practices. Email to Gina Glenne dated August, 4, 2009. 2 pp.

Hawke, Barbara. 2008. Executive Director, Black Canyon Land Trust. Subject: Management at the Black Canyon Land Trust's conservation easements for *Eriogonum pelinophilum*. Email to Gina Glenne dated December 31, 2008. 3 pp.

Jensen, Kerwin. 2009. Community Development Director, City of Montrose. Subject: Proposed beltway for the City of Montrose and *Eriogonum pelinophilum*. Email to Gina Glenne, USFWS, dated July 29, 2009.

Kartesz, John. 2009. Director, Biota of North America Project. Subject: The taxonomy of *Eriogonum pelinophilum*. Email to Gina Glenne, USFWS, dated January 6, 2009. 3 pp.

Kurzel, Brian. 2008. Coordinator, Colorado Natural Areas Program. Subject: Information for the 5-year review of *Eriogonum pelinophilum*. Letter to Al Pfister, USFWS, dated December 5, 2008. 4 pp.

McGillivary, David. 2007. Chief, Division of Federal Assistance, USFWS. Subject: Approval of the Wacker Ranch Land Acquisition for clay-loving wild buckwheat Grant #E-29-RL. Letter to Lyle Laverty, Colorado Division of Parks and Outdoor Recreation, dated February 21, 2007. 2 pp. + attachments.

Reveal, Jim L. 2001. Emeritus professor. Subject: The impacts of grazing on *Eriogonum pelinophilum*. Letter written to Jim Ferguson, Biologist, BLM dated October 16, 2001. 1 p.

Reveal, Jim. 2009. Professor, Cornell University. Subject: *Eriogonum pelinophilum* taxonomy, original collection, and extirpated sites. Email to Gina Glenne, USFWS,dated June 26, 2009. 2 pp.

Sharp, Charles. 2009. Wildlife Biologist, Uncompahgre Field Office, BLM. Subject: Photos of Transects 1 and 2 from the monitoring associated with the Colona grazing allotment and the health of *Eriogonum pelinophilum*. 14 pp.

Sharrow, Barbara. L. 2007. Field Manager, Uncompahgre Field Office, BLM. Subject: Impacts to *Eriogonum pelinophilum* from Bureau of Reclamation pipeline construction activities. Letter to Al Pfister, USFWS, dated August 3, 2007. 2 pp.

U.S. Fish and Wildlife Service. 2006. Subject: Proposed revisions to the recovery priority number for clay-loving wild buckwheat (*Eriogonum pelinophilum*). Letter to Regional Director, Region 6, dated April 20, 2006. 6 pp.

Personal Communication

Santec. 2007. Delta Regional Wastewater Facility Feasibility Study progress meeting for Project: 187327325. Dated January 17, 2007.

U.S. Fish and Wildlife Service. 2009. Western Colorado Ecological Services Office, Grand Junction, Colorado. Subject: *Eriogonum pelinophilum* clay-loving wild buckwheat Critical Habitat Proposal. Dated April 3, 2009. 14 pp.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
of *Eriogonum pelinophilum* (clay-loving wild buckwheat)

Current Classification: Endangered rangewide

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
X No change needed

Review Conducted By: Gina Glenne, Western Colorado Ecological Services Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 09/11/2009
Field Supervisor, Colorado Ecological Services Office

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve Mike Stempel Date 9/30/09
Regional Director, Region 6
Acting