Gypsum Wild Buckwheat
(*Eriogonum gypsophilum*)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
Albuquerque, New Mexico

5-YEAR REVIEW

Species reviewed: Gypsum Wild Buckwheat (*Eriogonum gypsophilum*)

TABLE OF CONTENTS

5-YEAR REVIEW
Gypsum Wild Buckwheat/*Eriogonum gypsophilum*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional or Headquarters Office: Region 2, Southwest
Contact: Susan Jacobsen, Chief, Threatened and Endangered Species Division, 505/248-6641; Wendy Brown, Recovery Coordinator, 505/248-6664

Lead Field Office: New Mexico Ecological Services Field Office
Contact: Lyle Lewis, Recovery Coordinator, 505-761-4714

1.2 Methodology used to complete the review:

The U.S. Fish and Wildlife Service (Service) conducts status reviews of species on the List of Endangered and Threatened Wildlife and Plants (50 CFR 17.12) as required by section 4(c)(2)(A) of the Endangered Species Act (Act) (16 U.S.C. 1531 *et seq.*). The Service provided notice of this status review via the Federal Register (70 FR 5460) requesting information on the status of the gypsum wild buckwheat (*Eriogonum gypsophilum*). This review was conducted by a team of biologists from the Service's Southwest Regional Office, New Mexico Ecological Services Field Office (NMESFO), New Mexico State Forestry Division (NMSF), and University of New Mexico (UNM). Robert Sivinski, NMSF Botanist, was contracted through a section 6 grant to gather the relevant information and prepare a draft of the review. The preliminary draft was reviewed for scientific accuracy by Phil Tonne, Botanist for Natural Heritage New Mexico at UNM; Paul Knight, Marron & Associates; and Dr. Richard Spellenberg, Professor Emeritus, New Mexico State University, Las Cruces. The final review and recommendations were prepared by a NMESFO recovery biologist.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:
70 FR 5460-5463, Wednesday, February 2, 2005.

1.3.2 Listing history:

Original Listing
FR notice: 46 FR 5730-5733
Date listed: January 19, 1981.
Entity listed: Species.
Classification: Threatened.

1.3.3 Associated rulemakings: Critical habitat designated at time of listing for Seven Rivers population in Eddy County, New Mexico, T20S R25E Section 19: N½, N½ NE¼ SE¼, N½ NW¼ SE¼; and T20S R26E Section 24: N½ NE¼, N½ S½ NE¼, NE¼ NW¼, N½ SE¼ NW¼; gypsum soils.

1.3.4 Review History: In 1993, a status survey of gypsum wild buckwheat was conducted for the Service by a private contractor. The analysis found that the threats to gypsum wild buckwheat populations from oil and gas development and mining had not been sufficiently minimized to proceed with delisting and recommended revision of the recovery plan. However the authors of the status survey admitted that they did not understand the extent of protection for gypsum wild buckwheat afforded by the designation of Special Management Areas and Areas of Critical Environmental Concern.

1.3.5 Species' Recovery Priority Number at start of 5-year review: 8. This priority number indicates a species with moderate degree of threat and high potential for recovery.

1.3.6 Recovery Plan or Outline

Name of plan or outline: Recovery Plan for Gypsum Wild Buckwheat (*Eriogonum gypsophilum* Wooton and Standley)
Date issued: March 30, 1984
Dates of previous revisions, if applicable: The recovery plan has not been revised.

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

_____**Yes,** go to section 2.1.2.
__X__**No,** go to section 2.2.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan[1] containing objective, measurable criteria?

_X_ ***Yes***, *continue to section 2.2.2.*

____ ***No***, *consider recommending development of a recovery plan or recovery criteria in section IV, Recommendations for Future Actions, and go to section 2.3., Updated Information and Current Species Status.*

The recovery plan states: "The criteria for delisting the gypsum wild buckwheat is based upon the designation of the critical habitat as a BLM Area of Critical Environmental Concern (ACEC) to maintain the population of 10,000 individuals. Some other special use designation which would secure the area from degradation due to human activities would be acceptable."

This criterion is supported by four primary recovery actions that are necessary to alleviate threats to the species and achieve the recovery criterion:

1. Prevent further impacts by designating the critical habitat area as an ACEC; develop a management plan; manage livestock grazing and study its effects; regulate recreational use, including Off-Road Vehicle (ORV) traffic, in the habitat; and monitor the effects of raised water level in Brantley Reservoir.
2. Maintain healthy populations by studying gypsum wild buckwheat biology and habitat characteristics.
3. Inventory suitable habitats for new populations.
4. Develop public appreciation and support for gypsum wild buckwheat.

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?

_X_ ***Yes,*** *go to section 2.2.2.2.*
____ ***No***, *go to section 2.2.3, and note why these criteria do not reflect the best available information. Consider developing recommendations for revising recovery criteria in section 4.0.*

When the recovery plan was written in 1984, only one population of gypsum wild buckwheat was known. This population contained approximately 10,000 individuals, and was deemed stable and healthy.

[1] Although the guidance generally directs the reviewer to consider criteria from final approved recovery plans, criteria in published draft recovery plans may be considered at the reviewer's discretion.

However, the area in which the known population occurred had the potential to be modified due to reservoir management and related road construction, grazing, ORV use, and mineral extraction. Therefore, the focus of the recovery criterion was to provide adequate regulatory protection to maintain habitat sufficient to support the existing population in the face of these threats. The criterion still reflects the best available information from the standpoint that population stability and adequate regulatory protection of habitat continue to be the central requirements of the species' recovery.

Since the recovery plan was written, two additional populations of gypsum wild buckwheat have been documented. Because the recovery plan's strategy of habitat protection was still deemed appropriate, protections were placed on these new populations consistent with the criterion. In addition, the four primary recovery actions have provided relevant guidance in investigating and alleviating threats to the species and its habitat during the last two decades.

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)?

_X_ ***Yes****, go to section 2.2.3.*
____ ***No****, go to section 2.2.3, and note which factors do not have corresponding criteria. Consider developing recommendations for revising recovery criteria in section 4.0.*

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 five listing factors in section 4(b) of the Act include:
(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms;
(E) other natural or manmade factors affecting its continued existence.

The recovery criterion is broadly threat-related, primarily in relation to Listing Factors A and D, in that recovery requires maintenance and protection of the Seven Rivers Hills gypsum wild buckwheat population of 10,000 individuals. The criterion does not identify specific threats, which are discussed in the body of the plan and in the recovery actions. Although refinements in survey methodology suggest that the original number of plants in the Seven Rivers Hills

population was overestimated, the population has remained stable for over 10 years and is protected by critical habitat designation and the Special Management Area designation, which limits surface occupancy and disturbance. In addition, two populations of gypsum wild buckwheat were discovered after the recovery plan was written and have been protected by BLM land use designations. As a result, the recovery criterion for this species has been met and exceeded. Listing Factors B, C, and E are not relevant to the criterion.

In support of the recovery criterion, the recovery actions also primarily focus on lessening and alleviating threats associated with Listing Factors A and D: prevent further impacts by designating the critical habitat area as an ACEC; develop a management plan; manage livestock grazing and study its effects; regulate recreational use, including ORV traffic, in the habitat; monitor the effects of raised water level in Brantley Reservoir; maintain healthy populations by studying gypsum wild buckwheat biology and habitat characteristics; inventory suitable habitats for new populations; and, develop public appreciation and support for gypsum wild buckwheat.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

Gypsum wild buckwheat is a rare, regionally endemic plant species that is presently known to occur in three populations located in Eddy County of southeastern New Mexico. It occupies gypsum soils and gypsum outcrops of the Permian-age Castile Formation. These habitats are dry and nearly barren except for common species of gypsophilic plants and gypsum wild buckwheat.

Distribution of gypsum wild buckwheat plants within its populations is patchy and follows geographic patterns of suitable gypsum outcrops, which are generally elongate and narrow. The lengths of these occupied outcrops are approximately 1.7 miles long for the Seven Rivers population, 1 mile long for the Black River population, and 2.2 miles long for the Ben Slaughter Draw population. Patches of gypsum wild buckwheat within populations are also relatively small. The area of occupied habitat is only 40 acres at Seven Rivers, little more than 30 acres at Black River, and 151 acres at Ben Slaughter Draw for a total world-wide extent of approximately 221 acres of habitat occupied by this species (Phil Tonne, unpublished maps, 2005).

Gypsum wild buckwheat is a perennial species that reproduces both by producing seed and also asexually by producing clone rosettes from rhizomes or root-sprouts. Seed production has been observed (Spellenberg 1977), but seedlings are rarely seen and most propagation occurs by asexual reproduction, or during infrequent climatic episodes suitable for seed germination and seedling

establishment (Knight 1993, Spellenberg 1977). Densities within patches of gypsum wild buckwheat range from 0.03 to 2.04 individual rosettes per square meter (Knight 1993). Distinguishing genetic individuals from clones is often problematic. Plant densities within three monitoring plots at the Seven Rivers population did not indicate any decreasing or increasing trends from 1987 to 1993 (Knight 1993).

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:

There are three known populations of gypsum wild buckwheat in southeastern New Mexico. Only one population (Seven River Hills) was known at the time of listing and development of the recovery plan, but suitable habitats were surveyed for this species and two additional populations were found in 1985.

Three monitoring plots were established at the Seven Rivers population in 1987 to study trends in plant size and density. These plots were monitored until 1993. Plant density in these plots fluctuated during this period, but the differences between years were not significant and no trends toward population increase or decrease were detected. The total of 145 plants in these three plots in 1993 was greater than the 106 plants present when the plots were established in 1987, but less than the highest count of 170 plants in 1988 (Knight 1993).

Estimates of the total number of gypsum wild buckwheat plants at the Seven Rivers population vary widely. This population is not continuous across the gypsum outcrop and the density within patches can vary from 0.004 to 1.22 plants per square meter (Knight 1993). The initial numerical estimate of this population was a total of 2,800 individual plants (Spellenberg 1977). A subsequent BLM estimate for Recovery Plan documentation in 1984 used four sampling transects across different types of occupied habitat and resulted in a total of 11,000 plants for the Seven Rivers population (Knight 1993). Knight (1993) later made another sampling effort with only four circular plots in different types of occupied habitat and estimated 14,168 plants in this population. These estimates vary because of the different methods used, habitat heterogeneity, and crude estimations of habitat area. Spellenberg's 1977 count was an attempt to estimate the number of genetic individuals by counting tight groups, or short lines, of rosettes as one individual. The subsequent population estimates by BLM and Knight counted each rosette as an individual plant, which would include numerous genetic clones of this rhizomatous species.

UNM-Natural Heritage Program mapped all patches of occupied habitat at Seven Rivers with Global Positioning System (GPS) in 2005 (Phil Tonne, unpublished map, 2005). The patches of occupied habitat mapped by Tonne fall within the general population boundaries mapped by Spellenberg (1977) and Knight (1993). This refinement in mapping technique resulted in the delineation of 40.3 acres

actually occupied by gypsum wild buckwheat. This is a significant reduction from the approximately 109 acres of occupied habitat circumscribed by Spellenberg (1977) and Knight (1993). The 1984 BLM estimate for Seven Rivers population site is not published and was not provided for this 5-year review. It appears BLM and Knight used the approximately 109 acres of occupied habitat as the multiplier for an average density estimate, overestimating this population. This original acreage estimate was the basis for the recovery criterion to maintain a population of 10,000 plants at Seven Rivers critical habitat area.

The Black River and Ben Slaughter Draw populations of gypsum wild buckwheat also occur as discontinuous patches of plants on the gypsum outcrops providing habitat. Knight (1993) used 10-50 x 2 meter belt transects to determine average density of plants within the Black River habitat. He estimated 80 acres of occupied habitat to arrive at a population estimate of 45,280 plants (rosettes). Subsequent GPS mapping (Phil Tonne, UNM, unpublished maps, 2005) of this population significantly reduced the area of occupied habitat on BLM and state-owned lands within this population (the private land portion of this population was not mapped by Tonne). The discrepancies between the population boundaries in Knight's 1993 map and Tonne's 2005 map are more likely the result of the more accurate methods employed by Tonne than an actual reduction of population coverage between 1993 and 2005. A combination of Knight's (1993) average density estimate of 0.14 plants/m^2 and Tonne's map showing 29.5 acres of occupied habitat results in a minimum population number of 16,660 plants at Black River. This estimate will increase when the area of occupied habitat on the private land portion of this population is known.

The largest population of gypsum wild buckwheat occurs at Ben Slaughter Draw. Knight (1993) also sampled this population with belt transects to determine an average density of 0.03 plants/m^2 within occupied habitat. He arrived at a population estimate of 47,233 plants (rosettes) on 288 acres. Subsequent Global Positioning System mapping of this population conforms to the general population boundaries of Knight's 1993 map, but significantly decreased the occupied habitat area to a more precise 154.1 acres (Phil Tonne, unpublished map, 2005). A total population estimate of 18,720 plants is obtained by using Knight's 1993 average density estimate and Tonne's 2005 mapped area of occupied habitat.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

Gypsum wild buckwheat is a distinct species without synonyms or taxonomic controversy.

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.):

Gypsum wild buckwheat was known from only a single population at the Seven Rivers Hills, approximately 13 miles northwest of Carlsbad, New Mexico, when listed as a threatened species in 1981. Two additional populations were discovered in 1988 in the Yeso Hills of southern Eddy County, New Mexico, one near Black River Village and another at Ben Slaughter Draw below Ben Slaughter Spring. These new populations in the Yeso Hills are within 8 miles of one another, but are nearly 30 miles disjunct from the Seven Rivers population. Extensive field surveys of gypsum habitats in Eddy and Chaves counties, New Mexico by BLM and state botanists have failed to locate additional populations of this species (Lightfoot and Sivinski 1994; Sherman, BLM, pers. comm., 2005; Sivinski, unpublished survey, 1999). Gypsum outcrops of the Castile Formation extend across the southern New Mexico border (Weber and Kottlowski 1959) and may provide suitable habitats for gypsum wild buckwheat in adjacent Culberson County, Texas. Potential habitats in Texas occur on private land and are difficult to access for botanical survey.

There are only three known populations of gypsum wild buckwheat, and all occur in Eddy County, New Mexico. Two misleading reports of other gypsum wild buckwheat locations should be mentioned in this review to discourage future use or reference. The 1993 status report for this species reported, and mapped, a population of gypsum wild buckwheat in Hay Hollow approximately 1.5 miles southwest of the Ben Slaughter Draw population (Knight 1993). A Hay Hollow population of this species does not exist in the area described and is a reporting error (Sivinski 2000; Paul Knight, pers. comm., 1999). Unfortunately, this erroneous Hay Hollow location has already been cited in published literature (Reveal 2005).

The occupied habitat limits of the Seven Rivers population were circumscribed and mapped by Spellenberg (1977) and Knight (1993). Knight (1993) also produced maps delineating the population boundaries of the Black River and Ben Slaughter Draw populations of gypsum wild buckwheat. These maps were produced by field observations transcribed to topographic maps and generally depict the gypsum outcrops populated by this species. Subsequent Geographic Information System maps of these populations, produced by the UNM Natural Heritage Program, were made by a surveyor walking the perimeters of occupied habitats with a GPS unit (Phil Tonne, unpublished maps, 2005). The new maps accurately depict the patchy distribution of these plants on gypsum outcrops and record significantly smaller areas of occupied habitat than the higher estimates produced by previous mapping efforts. Discrepancies between the 2005 population maps and earlier maps are the result of different surveying methods

and should not be interpreted as evidence of population fragmentation or decreasing distribution. This 5-year review did not discover any documented or anecdotal reports of gypsum wild buckwheat population fragmentation or decreasing distribution.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

Spellenberg (1977) described the gypsum wild buckwheat habitat at Seven Rivers, and the Black River and Ben Slaughter Draw habitats were described by Knight (1993). Sivinski (2000) found the habitat conditions at all three populations unchanged from previous reports. No exotic plant infestations have been observed within the gypsum habitats occupied by gypsum wild buckwheat (Sivinski, unpublished observations, 1990, 1994, 1999, 2005).

2.3.1.7 Other:

Global Information Systems computer mapping with GPSs technology has been used to accurately map the areas occupied by gypsum wild buckwheat. This has resulted in improved location and area estimation of occupied habitats and accurately depicts the patchy distribution of this plant across gypsum outcrops. The Bureau of Land Management contracted the UNM Natural Heritage Program to produce maps of all three known populations. These maps are not yet published, but are complete and were made available for this review (Phil Tonne, unpublished maps, 2005).

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

The 1981 listing determination of threatened status for gypsum wild buckwheat cited ORVs, grazing, and the Brantley Dam project as the potential threats to this species. At the time, the Seven Rivers Hills population was the only known population of gypsum wild buckwheat. Loss of any plants or habitat in the only known population of this species would have been considered a significant loss at that time. Two additional populations of gypsum wild buckwheat were subsequently documented at Black River and Ben Slaughter Draw, and can now be included in this reassessment of threats to this species.

In summary, several threats (i.e., reservoir management, grazing, and ORV use) identified at the time of listing and in the recovery plan are no longer deemed significant threats to the gypsum wild buckwheat. All three known populations contain between 11,000 and 18,000 plants. However, the total acres of occupied habitat are relatively small. At this time, the total known area of habitat occupied by gypsum wild buckwheat is less than 250 acres. Its presence in a small area makes this species vulnerable to land uses that might disturb large portions of this

area, or uses causing small disturbances that are cumulative over time. All gypsum wild buckwheat habitat occurs in areas with high potential for mineral extraction and associated development, especially oil and gas. This potential threat is currently mitigated by BLM Special Management Areas on significant portions of each gypsum wild buckwheat population, and these Special Management Area prescriptions will be needed as long as there is potential for mineral development on gypsum wild buckwheat habitats. The designation expires in September 2008 at the end of the BLM's current planning cycle, but BLM has promised to keep the designation through the next 20-year planning cycle (until 2028). So, BLM protections will persist if the species is delisted.

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

Threats from land uses that could destroy, modify, or curtail gypsum wild buckwheat habitats have been significantly diminished by Federal administrative actions on the BLM jurisdictions within each of the three known populations. Most BLM lands with gypsum wild buckwheat habitat have been designated as ACEC. By definition ACECs are areas where special management attention is required and can be designated to protect important fish and wildlife resources. These ACECs provide management guidance and in the case of gypsum wild buckwheat do not allow surface occupancy for most surface disturbing activities.

The designated critical habitat for gypsum wild buckwheat at Seven Rivers was given Special Management Area status in 1988 (USDI-BLM 1988) and protects about 95 percent of the habitat occupied by this population. A few acres of occupied habitat fall outside the Special Management Area boundaries on adjacent BLM and Bureau of Reclamation lands. Special Management Area management prescriptions at the Seven Rivers population are:

- Apply no surface occupancy stipulation to all future oil and gas leases.
- Avoid future right-of-way actions through Special Management Area.
- Withdraw from mining claim location and close to mineral material disposal and solid material leasing.
- Complete limited ORV designation and implementation plan to restrict vehicles to designated routes.
- Restrict fire suppression and geophysical operations to comply with ORV designation.
- Restrict surface disturbance including plant collections and camping within the area (USDI-BLM 1988).

All gypsum wild buckwheat habitats are within areas with high potential for fluid minerals leasing and extraction. Oil and gas well pads, roads, and pipelines are proliferating in this region of New Mexico. The BLM Special Management Area on the critical habitat of the Seven Rivers population presently eliminates this threat through the requirement of "no surface occupancy" for mineral leases within the critical habitat. Roads and pipelines associated with mineral

development also must avoid this area. The Seven Rivers Special Management Area protects about 95 percent of the occupied habitat from this land use. Special Management Areas with "no surface occupancy" stipulations for oil and gas leases were also administratively placed on BLM jurisdictions containing gypsum wild buckwheat habitats at the Black River and Ben Slaughter Draw populations in 1992 (USDI-BLM 1988, USDI-BLM 1992). These Special Management Areas protect approximately 50 percent of the total habitat at Black River and Ben Slaughter Draw from oil and gas development (Sherman, BLM, pers. comm. 2005). Approximately 65 percent of total habitat area in all three gypsum wild buckwheat populations is presently protected from surface impacts associated with oil and gas development.

Knight (1993) concluded that mineral development for oil and gas, and possibly gypsum, was the only serious potential threat to gypsum wild buckwheat. At this time, surface disturbance associated with federal mineral development is very unlikely to occur on gypsum wild buckwheat habitats within the BLM Special Management Areas. Mineral development could potential effect nearly 50 percent of the Black River population. In fact, there is presently an active gas well established very close to gypsum wild buckwheat habitat on the state trust land portion of this population (Sivinski 2000). The private land portion of the Black River population could also be impacted by future minerals development. However, about 50 percent of the Black River habitat, about 95 percent of the Seven Rivers habitat, and approximately 50 percent of Ben Slaughter Draw habitats have been protected by the "no surface occupancy" stipulation of the BLM Special Management Areas (Phil Tonne, UNM, unpublished maps, 2005). Oil and gas may be leased on these lands, but must be extracted by directional drilling from outside the Special Management Areas. Rights-of-ways for the roads and pipelines associated with oil and gas development must also be avoided within the Special Management Areas.

The Seven Rivers and Ben Slaughter Draw Special Management Areas also requires the withdrawal of minerals, such as gypsum, sulfur and salts, from claim and mine development. Mineral claims are not specifically withdrawn from the Black River Special Management Area. The chemical analysis found the gypsum of the Castile Formation to be 85 percent hydric gypsum, which is a suitable quality for mining (Weber and Kottlowski 1959, Knight 1993). Potential for gypsum mining of the Castile formation, however, is low at this time because of large deposits of higher quality gypsum presently being mined elsewhere in New Mexico (Knight 1993).

Other potential impacts to the Seven Rivers population of gypsum wild buckwheat have not occurred, partly because of the protections afforded by the Act. The widening of Highway 285 was accomplished without impacting the plants in or near this right-of-way (Sivinski 2000). Another right-of-way road request that would have impacted the Seven Rivers population has been avoided (Sherman, BLM, pers. comm., 2005).

The threat of flooding from Brantley Reservoir has not yet been realized. The maximum flood pool for Brantley Reservoir would temporarily affect a few acres of gypsum wild buckwheat habitat at the Seven Rivers population. Yet, the potential for this dam to fill was greatly overestimated and the conservation pool of this reservoir has remained far to the east of Highway 285 and the gypsum wild buckwheat population during the last 20 years. The maximum flood event pool in Brantley Reservoir could reach the 3,290-foot level and would temporarily flood a few acres of gypsum wild buckwheat habitat. An assessment of this impact was made by Knight (1993). He found 8 gypsum wild buckwheat plants below or at the 3,290-foot level. The soils in this area would become saturated for a time after a flood and could potentially be invaded by saltcedar (*Tamarix chinensis*), a noxious weed that often lines the banks of reservoirs. Knight surveyed another 20 vertical feet up to the 3,310-foot level where saltcedar might become established and located an additional 44 gypsum wild buckwheat plants. In 1993, there were 52 plants in the hypothetical zone of maximum flood impact. A flood event could potentially impact less than 100 plants in this population of several thousand plants. Therefore, Brantley Reservoir is not a significant threat to gypsum wild buckwheat.

The populations at Black River and Ben Slaughter Draw are not near any existing or proposed reservoirs and not threatened by flooding. The Seven Rivers population is the only known population that could be effected by flooding.

ORV traffic is not presently a serious problem. Very little, or no, evidence of ORV traffic has been observed in recent years in any of the three gypsum wild buckwheat populations (Knight 1993; Sivinski 2000; Phil Tonne, UNM, pers. comm., 2005). The lack of ORV traffic at the Black River and Ben Slaughter Draw Special Management Areas may be attributable to their remote locations and stands of thorny mesquite shrubs surrounding the gypsum wild buckwheat populations (Knight 1993). The BLM has established Special Management Area restrictions for ORV traffic that protects 95 percent of the Seven Rivers habitat and 50 percent of the Ben Slaughter Draw habitat from this potential impact. This Special Management Area restriction cannot eliminate occasional ORV violations, but severe impacts from frequent ORV use are unlikely to be tolerated by BLM. At this time, only the Seven Rivers Special Management Area has signs posted to restrict ORV traffic, and these are often vandalized (Sherman, BLM, pers. comm. 2005).

Livestock grazing is the predominant land use in all gypsum wild buckwheat habitats. Cattle will not usually eat gypsum wild buckwheat plants (Sivinski, unpublished observations, 1990, 1994, 1999, 2005). Forage production on these gypsum outcrops is relatively low and does not attract or concentrate livestock. The gypsum wild buckwheat recovery plan did not identify livestock grazing as a serious potential threat to the critical habitat at Seven Rivers (Limerick 1984). Livestock use of the Seven Rivers habitat appears to have decreased in recent

years (Knight 1993, Sivinski, unpublished observations, 1990, 2005). Livestock use of the habitat in the Black River population also has little effect on gypsum wild buckwheat and the river is remote enough from the gypsum outcrop to preclude concentrated livestock activity (Knight 1993, Sivinski 2000).

The Brantley Dam conservation pool was anticipated to be in close proximity to the Seven Rivers population of gypsum wild buckwheat and was expected to concentrate livestock that could trample plants and make erosion-prone trails through this habitat. The actual conservation pool during the last 20 years remains greater than one mile distant from this population and livestock have not concentrated in this habitat.

The Ben Slaughter Draw population is immediately adjacent to Ben Slaughter Spring and Jumping Spring, which are water sources that do concentrate livestock use. Livestock trailing and trampling of gypsum wild buckwheat plants in this population has been reported by Knight (1993), especially in the immediate vicinity of Ben Slaughter Spring. Knight (1993) observed that plants impacted by livestock trampling tended to produce smaller rosettes than plants not effected, thus shifting that portion of the population towards a higher percentage of juvenile forms. Other palatable species that occupy gypsum wild buckwheat habitat at Ben Slaughter Draw were observed to be heavily grazed by cattle in 1999 (Sivinski 2000). The BLM has partly mitigated this impact by erecting a livestock-proof fence that encloses 20 acres around Ben Slaughter Spring, including a few acres of gypsum wild buckwheat habitat with several hundred plants. This fenced enclosure occurs within the 360-acre BLM ACEC that protects the spring and surrounding upland from land-use surface occupancy. The gate to the BLM enclosure is not always closed to livestock entry (Sivinski 2000), but does give the opportunity to manage the effects of grazing in this area.

All three gypsum wild buckwheat populations occur near, or within a few miles, of permanent natural waters sources. Therefore, the habitats of this species have experienced more than a century of livestock use that, at times, could have been very intense and abusive. In fact, the recent heavy concentrations of livestock within the Ben Slaughter Draw population are probably no more, and possibly less, than the numbers of livestock that have concentrated in this area for many decades. Yet all of the gypsum wild buckwheat populations persist as apparently healthy plants that are relatively unaffected by livestock. These gypsum outcrop habitats may have been modified by this long history of livestock use, but continue to support large populations of this species. More than 75 percent of the gypsum wild buckwheat habitats occur on BLM lands. Currently BLM livestock stocking rates appear to have little, or no, impact on the Seven Rivers and Black River populations. It is also not evident that heavy concentrations of livestock at Ben Slaughter Draw have caused a decline of this population. The prevailing land use of livestock grazing is unlikely to become a serious threat to this species in most of its habitats, especially at the Seven Rivers and Black River locations.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

Gypsum wild buckwheat has no recreational value and is not offered for sale in the plant materials market at this time. It is a handsome plant that could attract rock garden hobbyists, but may not be suitable for garden soils that are not gypseous. Scientific collections have been confined to the permitted taking of a few vouchered specimens to document new locations of this species.

In addition to alleviation of threats, positive steps have been taken to inform and educate the public about the gypsum wild buckwheat. The New Mexico Rare Plants web site was established in 1998 by the New Mexico Rare Plant Technical Council to provide the public with information on rare, threatened and endangered plant species. Descriptive information and illustrations of gypsum wild buckwheat are prominently displayed on this web site. This effort has helped fulfill the intent to provide information to the public and foster support for the conservation of gypsum wild buckwheat. A poster of federally threatened and endangered plants of New Mexico was completed and printed in 2006 and is being disseminated to schools and the general public.

2.3.2.3 Disease or predation:

There are no known documented or anecdotal reports of disease or predation on gypsum wild buckwheat.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

Federal regulatory mechanisms have been effective in removing or managing many of the threats that could cause gypsum wild buckwheat to become endangered. Highway 285 was widened without impact to the Seven Rivers population and Special Management Area designations have protected the critical habitat at Seven Rivers from mineral development and ORV traffic. The BLM also regulates and manages livestock grazing on significant portions of all three of the known populations.

ORV traffic prohibitions are difficult to enforce because of sign vandalism that law enforcement officers cannot keep a continuous watch. However, the Special Management Area restrictions on ORV traffic at the Seven Rivers critical habitat area and Ben Slaughter Draw appear to have produced the desired outcome of diminishing ORV impacts.

The BLM Special Management Area at the Black River population requires a “no surface occupancy” stipulation for all oil and gas leases, but does not have prescriptions to protect this area from mineral claims or ORV traffic. All three gypsum wild buckwheat Special Management Area designations in BLM Resource Management Plans remain in effect for as long as they are needed

(Sherman, BLM, pers. comm., 2005). It is not clearly stated in the Carlsbad Resource Area Management Plan that future plan revisions shall continue to maintain gypsum wild buckwheat Special Management Area restrictions after this species is removed from the Federal list of threatened and endangered species (USDI-BLM 1988).

A few acres of gypsum wild buckwheat habitat in the Seven Rivers population occur on BLM land outside the designated Special Management Area and on Federal land in Bureau of Reclamation jurisdiction, which is also not within the Special Management Area. Land uses that may affect gypsum wild buckwheat on these lands, presently, must be reviewed by the Service. Protections afforded by this review will cease when gypsum wild buckwheat is removed from the Federal list of threatened and endangered species.

There are no regulatory protections for federally listed threatened and endangered plant species from surface disturbing land uses on private or state-owned lands, unless they are authorized, funded, or carried out by a Federal agency. Approximately 50 percent of the gypsum habitats occupied by gypsum wild buckwheat at the Black River population occurs on private and state-owned land. About 10 percent of the occupied habitat in the Ben Slaughter Draw population is on private and state-owned land (Phil Tonne, unpublished maps, 2005). The New Mexico State Land Office is aware of the gypsum wild buckwheat habitats on its state trust lands. The State Land Office Commissioner has authority to avoid land use impacts to these habitats, but is not required by statute or regulation to do so.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

No new anthropogenic threats to gypsum wild buckwheat have been identified since the last status report in 1993.

Exotic plant species can become potential threats to rare plants, such as gypsum wild buckwheat. African rue (*Peganum harmula*) and Malta starthistle (*Centaurea melitensis*) are noxious weeds that are becoming well established on some areas with gypseous soils in southeastern New Mexico. Thus far, these weeds appear to be confined to roadsides, pipelines and other areas of severe soil disturbance. They are not yet infesting gypsum wild buckwheat habitats, which are relatively undisturbed soils (Sivinski, unpublished observations, 1990, 1994, 1999, 2005).

2.4 Synthesis

Gypsum wild buckwheat was known from only a single population on the Seven Rivers Hills when it was listed as a threatened species in 1981. An area of critical habitat that covered 95 percent of this population was designated at the time of listing. Population monitoring from 1987 to 2005 has not revealed any significant increase or decrease in

numbers of plants since the recovery plan was adopted in 1984. No surface-disturbing activities have occurred in the critical habitat area since 1984 and this habitat remains unchanged. The Seven River Hills population was still the only known location for this species when its recovery plan was adopted in 1984. The recovery plan concluded that this threatened species could be delisted when the critical habitat area was designated an ACEC, or similar special use designation. Bureau of Land Management designated this critical habitat as an ACEC in 1988. This designation provided the habitat protections prescribed by the recovery plan.

Two additional populations have been documented in Eddy County since this plant was listed. The number of plants in those populations also appears relatively unchanged since their discovery; the Black River population has a minimum of 16,660 plants, and the Ben Slaughter Draw population is estimated around 18,270. These numbers are estimates, as it is difficult to estimate the number of plants in each population because of their variable density and patchy distribution across occupied gypsum outcrops. All previous and current estimates of plant numbers lack precision, but adequately demonstrate substantial populations at the three known locations. There are no reports of extirpations or obvious declines in gypsum wild buckwheat populations since it was listed as a threatened species in 1981.

Based on extensive survey efforts in New Mexico, it is unlikely that other populations will be located. Potentially suitable habitat exists in Texas on private land, but no surveys have been conducted.

Gypsum wild buckwheat is currently listed as threatened with critical habitat. Threats identified at the time of listing and in the recovery plan are no longer deemed significant; and two new populations have been discovered which add to an estimated population between 11,000 and 18,000 plants. The Service recommends that gypsum wild buckwheat be removed from the list of threatened species as long as a Recovery Management Agreement with BLM is in place to alleviate the future threat of mineral, and oil and gas development. Otherwise, delisting may cause existing special management prescriptions to cease, and this plant would, again, become a threatened species.

According to Section 3 (20) of the Endangered Species Act of 1973, as amended, “The term ‘threatened species’ means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Gypsum wild buckwheat no longer meets this definition.

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
_X_ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
____ *Extinction*
____ *Recovery*
_X_ *Original data for classification in error*
____ No change is needed

3.2 New Recovery Priority Number: 14

Brief Rationale: Change to 14, which indicates a species with no imminent threats and high recovery potential.

3.3 Listing and Reclassification Priority Number, if reclassification is recommended *(see Appendix E)*

Reclassification (from Threatened to Endangered) Priority Number: ____
Reclassification (from Endangered to Threatened) Priority Number: ____
Delisting (Removal from list regardless of current classification) Priority Number: __6__

Brief Rationale: A delisting priority number of 6 indicates a low management impact and an unpetitioned action.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

A mechanism to ensure that future management planning by the BLM continues to provide similar provisions to those currently guiding the management of gypsum wild buckwheat and its habitat is necessary. We propose the development of a recovery management agreement (Scott et al. 2005) with the BLM to institutionalize the current protections for gypsum wild buckwheat in perpetuity.

Once a recovery management agreement is in place, the current status and level of threats for gypsum wild buckwheat warrant its delisting.

5.0 REFERENCES

Knight, P.J. 1993. A status review of gypsum wild buckwheat. Submitted to FWS, Region 2, Albuquerque, NM.

Lightfoot, K. and R. Sivinski. 1994. Rare plant survey of New Mexico state trust lands. Section 6 Progress Report. Submitted to FWS, Region 2, Albuquerque, NM.

Limerick, S. 1984. Recovery plan for gypsum wild buckwheat (*Eriogonum gypsophilum* Wooton & Standley). Approved March 3, 1984 by FWS, Region 2, Albuquerque, NM.

New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page. http://nmrareplants.unm.edu (Latest update: 9 June 2005).

Reveal, J.L. 2005. Polygonaceae: *Eriogonum*. In Flora of North America, north of Mexico. Vol. 5, Part 2. Ed. by Flora of North America Association. Oxford University Press.

Scott, J.M, D.D. Goble, J.A. Wiens, D.S. Wilcove, M. Bean, and T. Male. 2005. Recovery of imperiled species under the Endangered Species Act: the need for a new approach. Front Ecol Environ; 3(7): 383-389

Sivinski, R.C. 2000. Gypsum wild buckwheat: Intermittent monitoring results. Section 6 progress report submitted to FWS, Region 2, Albuquerque, NM.

Spellenberg, R. 1977. A report on the investigation of *Eriogonum gypsophilum* and *Haplopappus spinulosus* subspecies *laevis* in the vicinity of the Brantley Reservoir, Eddy Co., NM.

USDI-BLM. 1988. Carlsbad Resource Management Plan, Appendix C. Roswell District, New Mexico. Adopted September 19, 1988.

USDI-BLM. 1992. Carlsbad Approved Resource Management Plan, Amendment and Record of Decision, October 1992. Carlsbad Resource Area, NM.

Weber, R.H. and F.E. Kottlowski. 1959. Gypsum resources of New Mexico. Bulletin 68, New Mexico Institute of Mining and Technology, Socorro, NM.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Gypsum Wild Buckwheat (*Eriogonum gypsophilum*)

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
_X_ **Delist**
____ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: 6

Review Conducted By: Wendy Brown, Recovery Coordinator, U.S. Fish and Wildlife Service, Southwest Region

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 16/12/07

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, Ecological Services, Fish and Wildlife Service, Region 2

Approve _____ *Date* 9 November 2007