

Eureka Valley Dunegrass
(Swallenia alexandrae)

**5-Year Review:
Summary and Evaluation**



Gerald and Buff Corsi © California Academy of Sciences

**U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Ventura, California**

September 2007

5-YEAR REVIEW
Eureka Valley dunegrass / *Swallenia alexandrae*

TABLE OF CONTENTS

| | |
|--|-----------|
| 1. GENERAL INFORMATION | 1 |
| 1.1. REVIEWERS | 1 |
| 1.2. METHODOLOGY USED TO COMPLETE THE REVIEW: | 1 |
| 1.3. BACKGROUND: | 1 |
| 2. REVIEW ANALYSIS..... | 2 |
| 2.1. APPLICATION OF THE 1996 DISTINCT POPULATION SEGMENT (DPS) POLICY | 2 |
| 2.2. RECOVERY CRITERIA | 2 |
| 2.3 UPDATED INFORMATION AND CURRENT SPECIES STATUS | 3 |
| 2.4 SYNTHESIS..... | 11 |
| 3 RESULTS | 11 |
| 3.1 RECOMMENDED CLASSIFICATION | 11 |
| 3.2 NEW RECOVERY PRIORITY NUMBER <u> 13 </u> | 12 |
| 3.3 LISTING AND RECLASSIFICATION PRIORITY NUMBER..... | 12 |
| 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS | 12 |
| 5.0 REFERENCES | 13 |
| APPENDIX A: SPATIAL DISTRIBUTION OVER TIME..... | 17 |

5-YEAR REVIEW
Eureka Valley dunegrass / *Swallenia alexandrae*

1. GENERAL INFORMATION

1.1. Reviewers

Leads Regional Office: Diane Elam and Mary Grim, 916-414-6464, California Nevada Operations

Leads Field Office: Brian Croft (805-644-1766 ext. 302) and Connie Rutherford (805-644-1766 ext. 306), Ventura Fish and Wildlife Office

1.2. Methodology used to complete the review:

Brian Croft, of the Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service (Service), collected all information that has become available since the time of listing. This review considered peer-reviewed literature, California Department of Fish and Game, Bureau of Land Management (Bureau), and National Park Service (NPS) reports, and personal communications with current and former staff of Death Valley National Park (Park) were relied on. A site visit was also performed to assess the current level of threats and the current distribution of populations within Eureka Valley. We based this review primarily on the level of threats currently present within the Eureka Valley.

1.3. Background:

1.3.1. FR Notice citation announcing initiation of this review:

The FR notice initiating this review was published on July 7, 2005 (70 FR 39327). This notice opened a 60-day request for information period, which closed on September 6, 2005. A second FR notice was published on November 3, 2005 (70 FR 66842), which extended the request for information period for an additional 60 days until January 3, 2006. No new information was received as a result of these notices.

1.3.2. Listing history

Original Listing

FR notice: 43 *Federal Register* 17910 (Wednesday, April 27, 1978)

Date listed: The final rule was published April 26, 1978 and became effective May 27, 1978.

Entity listed: species (*Swallenia alexandrae*)

Classification: Endangered

1.3.3. Associated rulemakings

No associated rulemaking has occurred for this species.

1.3.4. Review History

The U.S. Fish and Wildlife Service's Ventura Fish and Wildlife Office reviewed the status of this species in 1994 (Noel 1994), and concluded that downlisting was warranted. However, the Service did not publish a proposed rule to downlist this species because the 1994 Desert Protection Act passed these lands to the NPS. At that time, the Service was uncertain about how the Park would manage the threats to this species.

1.3.5. Species' Recovery Priority Number at start of 5-year review

The Eureka Valley dunegrass had a recovery priority of 7, which means it is a monotypic genus with a moderate degree of threat and a high recovery potential.

1.3.6. Recovery Plan or Outline

Name of plan: Eureka Valley Dunes Recovery Plan (Service 1982)

Date issued: December 13, 1982

Dates of previous revisions: No revisions have been made.

2. REVIEW ANALYSIS

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

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

2.2. Recovery Criteria

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

The species has an approved recovery plan. However, the criteria, identified by the plan as "primary objectives," are not measurable criteria pertaining to specific threats (e.g., eliminate off-highway vehicles or sandboarding within habitat) or species attributes (e.g., population size, density, etc.). They are general in nature and are not in accordance with current standards.

2.2.2 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information (for threats-related recovery criteria, please note which of the 5 listing factors are

addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here):

Objective A - Protect the extant populations from existing and potential human threats.

The Bureau of Land Management (Bureau) and Death Valley national Park (Park) have protected all extant populations of this species from off-highway vehicles, sandboarding, horseback riding, camping, collection, and other human threats by establishing wilderness areas, instituting new Park policies, and enforcement of regulations. We were unable to find evidence that other human activities in the area were threatening populations of this species. Achievement of this recovery criterion addresses Factors A, B, D, and E of the 5-factor analysis. We could find no information to suggest that Factor C (disease or predation) was relevant to this species.

Objective B - Determine the number of individuals/populations/acres of habitat necessary for this species to maintain itself, without intensive management, in a vigorous, self-sustaining manner within its natural historical dune habitat (estimated at 6,000 acres) (Service 1982).

We consider Objective “B” to be a recovery action item rather than a measurable recovery criterion.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

The Eureka Valley dunegrass (*Swallenia alexandrae*) is a perennial, hummock (mounds of windblown soil that develop at the base of plants on dune landscapes) forming grass comprising a monotypic genus of the Poaceae Family. It occupies sand dune habitats in the Eureka Valley of Inyo County, California. It is in a dormant state during the winter, but begins to produce new shoot growth around February. Growth accelerates in May; it produces panicles (loose, multi-branched clusters of flowers) from April to June and disperses seed between May and July (Service 1982). Pavlik (1979) found that shoot extension of the dunegrass could approach 1 centimeter per day in June and July and that total length of stems produced in 1 year could be near 1 meter.

Spatial Distribution

In general, the Eureka Valley dunegrass occupies relatively steep slopes of four dunes in the southern portion of Eureka Valley (Bagley 1986): the Eureka Dunes, Saline Spur Dunes, Marble Canyon Dunes, and an unnamed site 3 kilometers south of the Marble Canyon Dunes. These dunes are all within 15 kilometers of each other. All four populations are on public lands, managed by Death Valley National Park. The geographic distribution of this species within Eureka Valley has not substantially changed since the time of listing, indicating that the species is likely stable on a rangewide scale. For additional information regarding survey efforts that have located this species since the time of listing, see Appendix A.

Abundance and Population Trends

The Bureau and the Park have not been able to determine trends in population size for this species because they have not had the resources to institute adequate monitoring. Bagley (1986) collected some baseline density information at permanent plots on the Eureka Dunes and at two satellite dune populations (Marble Canyon and Saline Spur Dunes), but given the small sample size and high degree of variability in the results, these values could not be extrapolated to estimate the size of the population. Mark Bagley and Connie Rutherford resurveyed these plots in 1988, but they did not analyze the data to determine trends (C. Rutherford, U.S. Fish and Wildlife Service, pers. comm. 2006). The Park has not instituted any formal monitoring efforts to repeat or expand on Bagley's work.

Survivorship and Demography

Pavlik and Barbour (1988) concluded that populations were growing. This species produces low numbers of seeds per individual, has moderate rates of post-dispersal seed predation, and has infrequent germination and establishment. However, mature individuals are long-lived and can apparently set seed every year. Based on half-life estimates (the time in which a population decreases by 50 percent), they estimated that the Eureka Valley dunegrass could persist for 88 years in the absence of any recruitment, which compares favorably with estimates for other perennial grasses (Pavlik and Barbour 1986).

With regard to age class distribution within this species, it appears that established adult plants may predominate, but it depends on the time of year. Bagley (1986) found that all of his plots had a majority of subadult plants, but he collected this data prior to the intense heat of the summer when many seedlings are lost. Large germination events can greatly affect the overall population size, but these effects are not usually lasting due to high seedling mortality (Pavlik and Barbour 1986). This information, along with Pavlik and Barbour's half-life estimates, indicates that recruitment from year to year is likely low, however high recruitment each year is probably not necessary to ensure stability because of the long-lived nature of the plants once established.

Seed Production and Seedbank Ecology

Pavlik and Barbour (1985) observed seed production rates of 3,100 seeds per year from average sized Eureka Valley dunegrass hummocks, which is quite low when compared to other perennial grasses. Although there is no evidence of a large stable seed bank for this plant, the seeds can remain viable for up to 8 years (Pavlik and Barbour 1985). Eureka Valley dunegrass seeds that do not possess floral bracts are not likely to disperse far from the dune hummock even in winds as high as 25 miles per hour, but seeds containing them can move as far as 100 meters per hour (Pavlik 1985). This ensures that at least some seeds remain at established plant clusters, which serve to ensure the persistence of the cluster, while other seeds disperse and potentially form new hummocks.

Genetics

Based on genetic analysis of samples collected at all four populations, it appears that this species has relatively little genetic diversity. There is no evidence of substructuring of populations or of differences between populations (Bell 2003).

Taxonomy

No name changes or changes in taxonomic relationship have been presented since the listing.

Habitat Condition

Quantitative monitoring data to document changes in habitat extent or distribution for this species are not available. However, because the species relies on dune systems, the amount and distribution of habitat has not likely changed substantially since the time of listing. The geographic extent of the sand dune systems within the Eureka Valley amounts to 19 square miles (Dean 1978), but only a portion of that has the appropriate habitat characteristics for the Eureka Valley dunegrass. Since 1976, the control of off-highway vehicle (OHV) use, removal of campground facilities, and management of other potentially harmful visitor uses has likely resulted in an increase in suitable habitat available to the Eureka Valley dunegrass.

Conservation Actions Taken to Protect Populations and Habitat

Since the time of listing, control of OHV use, camping, and other human activities in Eureka Valley by the Bureau and the Park has resulted in increased suitability of available habitat in most areas. Prior to listing, the Eureka Valley had no formal land use designation and the area was open to unrestricted OHV recreation. During the 1960s, the type of use at the Eureka Dunes changed from non-motorized to motorized recreation. During this time, recreational use increased markedly and indiscriminate OHV use of the dunes began to exhibit a destructive effect on the dune vegetation. The Eureka Dunes became a favorite challenge to OHV enthusiasts, while other forms of recreation declined (Service 1982).

Following the proposed listing rule for this species, the Bureau closed the Eureka Dunes and some of the surrounding area to OHVs in 1976. In 1980, the Bureau designated the Eureka Dunes and some of the surrounding area as an Area of Critical Environmental Concern (ACEC). Through the management plan for this ACEC, the Bureau designated campsites, increased ranger patrols to enforce the vehicle closures, closed undesignated routes, installed vehicle barriers, performed monitoring, and instituted an educational outreach program (Bureau 1982). The Bureau's efforts resulted in few observed violations between 1979 and 1994 (Service 1982, Harris 1994, DeDeker 1994, and Stormo 1994 *in* Noell 1994). These successes prompted the Service to prepare a draft proposal to downlist this species in 1994. The Service did not publish this proposal because the 1994 Desert Protection Act passed management of this area to the Park, and the Service did not know what actions the Park was going to take to manage the OHV threat.

Since transfer of the management of Eureka Valley from the Bureau to the Park, all of the dune systems within Eureka Valley have been designated as wilderness areas and illegal OHV use within these wilderness areas has occurred only on a sporadic basis. While this illegal use has occasionally occurred on the dunes, it has not approached levels seen prior to listing and has not resulted in any reported incidence of adverse effects to Eureka Valley dunegrass populations (see Section 2.3.2.4). Despite the low level of non-compliance, the Park has continued to institute increased measures to completely eliminate this threat. In 1995, the Park began regular ranger patrols, raked tracks in closed areas, removed routes that were now within wilderness areas, fixed fences, limited the use of roads on the west side of Eureka Dunes, installed new barriers, and installed educational signs (NPS *circa* 1999). In 2001, the Park completed a site improvement project that moved camping and parking facilities further away from the base of Eureka Dunes and closed all routes that accessed the base of this dune system (NPS 2000). In addition, the Park has prohibited sandboarding and horseback riding on the dunes because of the potential for this activity to adversely affect populations of this species (NPS 2006).

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

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

OHV Recreation

At the time of listing in 1978, the Service identified OHV recreation as the primary threat to this species. Pavlik (1979) observed a 33 percent loss in shoots from light to moderate levels of OHV impacts to small Eureka Valley dunegrass plants and complete loss of plants from severe, tire spinning impacts. In addition, heavily affected plants are less likely to survive and set seed in subsequent seasons (Pavlik 1979).

Prior to listing, slopes ascending the Eureka Dunes were used for OHV access to higher dune ridges, OHV activity fanned out between campsites and the dune slopes, and other OHV activity occurred around the perimeter of the Eureka Dunes (Service 1982). Following publication of the proposed listing rule, the Bureau closed the main Eureka Dunes and part of the surrounding area to OHVs (43 *Federal Register* 17910). The closures and management have continued and increased under the Park and all populations of this species are now within designated wilderness areas that prohibit OHVs. The management of the OHV threat at the Eureka Dunes by the Bureau and the Park has resulted in the near elimination of OHV use at the Eureka Dunes. The remote location, inaccessibility, and wilderness status of the Saline Spur Dunes and Marble Canyon Dunes appears to be providing sufficient protection for dune habitats at these locations. The current intensity of the OHV threat relative to pre-listing levels is much lower. It is almost entirely localized to areas on and adjacent to the northern end of the Eureka Dunes and has resulted in no documented cases of adverse effects to Eureka Valley dunegrass populations under Park management and few under Bureau management (NPS *circa* 2000, Beymer 1996, Beymer 1997b-g, Peterson 1998b-c, Dellingers 1998a-c, Anderson 1998, Rods 1998, Rods 2000).

The Service recently allocated \$88,000 in “Showing Success” recovery funding for the implementation over the next year of final recovery actions for the Eureka Valley dunegrass and the endangered Eureka Dunes evening-primrose (*Oenothera californica ssp. eurekaensis*). These actions will focus on taking the last steps needed to ensure the recovery of these two species, and will include installation of signs and boundary markers to control vehicle use, restoration of OHV-damaged areas, increased visitor education, and population monitoring of these two species. Although the current level of OHV activity and other human threats has been significantly reduced since the time of listing, the implementation of these final recovery actions will assist the Park in reducing these threats and update information on the status of these species that will ensure delisting is warranted. This funding also will help address recommendations for future actions identified in section 4 of this review.

Horseback Riding and Sandboarding

In the late-1990s, Park staff became concerned about horseback riding on the Eureka Dunes because of the potential for this activity to result in damage to Eureka Valley dunegrass. There is no information regarding the extent of the threat during this period or specific scientific evidence related to the adverse effects of trampling by horses, but the Park prohibited this activity because of the potential for impacts from trampling (NPS 2006).

During this same period, the sport of sandboarding became more popular, and Park staff and visitors noticed an increase in this activity at the Eureka Dunes. An article in an October 1997 issue of *Esquire Magazine* identified Eureka Dunes as a location to pursue this activity. Between 1997 and 1999, Park staff observed 10

instances of sandboarding on the dunes and there were a handful of other complaints from the public regarding this activity (NPS *circa* 2000). There is no information regarding the extent of the adverse effects that this activity had on the Eureka Valley dunegrass, but crushing of individual plants of this species was observed in 1997 (Beymer 1997h). However, the Park considered potential adverse effects to be similar to those of low to moderate OHV use, and prohibited this activity in 2002 (Croissant 2005, NPS 2006).

Campgrounds and Access Routes

After listing of this species, it became evident that an access road that reached the Eureka Dunes at its northwest corner was aiding illegal OHV activity. The end of this route became the focal point of OHV activities and the site where most adverse effects to habitat originated (Service 1982). The recovery plan also indicated that camping along the perimeter of the dunes was a minor threat that land managers should address. It recommended the prohibition of camping on the dunes, enforcement of OHV prohibitions, establishment of defined camping areas away from the dunes, and transformation of the northwest access point into a day use only area. The Bureau and the Park have implemented the recommendations regarding camping and the access route at the northwest access point (NPS 2000, NPS 2006). The Park continues to enforce the wilderness closures that prohibit OHV use on the dunes. Due to the Parks continued enforcement of OHV prohibitions that began under Bureau management, OHV incursions are sporadic and have not resulted in any documented damage to the Eureka Valley dunegrass (NPS *circa* 2000, Beymer 1996, Beymer 1997b-g, Peterson 1998b-c, Dellingers 1998a-c, Anderson 1998, Rods 1998, Rods 2000).

In summary, habitat loss due to OHV use was the primary threat to the plant at the time of listing. Since then, the horseback riding and sandboarding have been identified as potential threats. With the Parks ownership of the land and the subsequent designation of the wilderness area, these activities have been prohibited. As a result, the threat of habitat loss has been eliminated.

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

The Eureka Valley dunegrass has no known commercial or recreational value that the Service would consider consumptive. Educational groups frequently visit the Eureka Dunes, but the Service and the Park are unaware of any activities that would be consumptive to the point of overutilization. Since listing, there have been a handful of recovery permit requests for studies involving consumptive uses of plants, seeds, or plant parts. These studies usually involve collection of seeds for laboratory experiments or collection of voucher specimens for herbaria. It does not appear that this level of research and collection rises to the level of overutilization.

2.3.2.3 Disease or predation:

Pavlik and Barbour (1985) estimated that, of the plants they observed, black-tailed jackrabbits (*Lepus californicus*) grazed 75 percent of the shoots of Eureka Valley dunegrass during summer months, and that 30 to 40 percent of the plants in the population as a whole showed signs of jackrabbit herbivory. However, during this time, there was initiation of new lateral shoots on stems that jackrabbits had previously pruned. They concluded that jackrabbit pruning would seldom lead to the death of individual plants; however, the pruning could have a negative effect on seed production if it occurs prior to ripening and dispersal. Pavlik and Barbour (1985) also observed seed predation of *Swallenia alexandrae* seeds by kangaroo rats and red ants. There is no information regarding the magnitude of seed predation or what adverse effects, if any, it is having on the species as a whole.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

All areas containing populations of the Eureka Valley dunegrass are currently on lands managed by the Park and are within designated wilderness areas. The Wilderness Act provides the Park with the legal authority and regulatory mechanisms to prevent OHV access into habitat for this species. The Park has prohibited other activities, such as sandboarding and horseback riding that potentially have adverse effects to populations of this species (Croissant pers. comm. 2005). Therefore, the Park currently has legal mechanisms in place to enforce management of human threats to the Eureka Valley dunegrass. In addition, any proposed activities or changes in management within the Eureka Valley would require review under the National Environmental Policy Act, which would require an analysis of the impacts of the action on this species.

Park staff have reported sporadic incidents of illegal OHV incursions into wilderness areas under these restrictions. A review of incident and site visit reports, covering 1996 through early 2000, revealed 19 reports of non-compliance with existing vehicle closures at the Eureka Dunes and one report for Marble Canyon (NPS *circa* 2000, Beymer 1996, Beymer 1997b-g, Peterson 1998b-c, Dellingers 1998a-c, Anderson 1998, Rods 1998, Rods 2000). During this period, staff of the Park were visiting the Eureka Dunes and performing vehicle and foot patrols an average of 2 to 3 times a month. The main location of OHV activity, as the recovery plan noted, is still at the north end of the Eureka Dunes. While some illegal OHV activity does occur on the dunes, there are no reports of adverse effects to Eureka Valley dunegrass populations. From this information, we conclude that the regulatory provisions of the Wilderness Act are adequate to deal with the OHV threat to Eureka Valley dunegrass populations. There are no reports of noncompliance with the sandboarding or horseback riding restrictions. Under the Park's current management, we believe the Park's enforcement of existing regulatory mechanisms is adequate and factor d is not a threat.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Russian Thistle Invasion

There has been concern over invasion of the Eureka Valley by barbwire Russian thistle (*Salsola* spp.) since the late-1980s (Service 1990). It appears that this invasion is recent or that it goes through cycles of expansion and contraction. Bagley 1994 (*in* Noell 1994) reported that it was not widespread in 1984 or 1985, but by the late-1980s, it had invaded some areas of the Eureka Dunes and Marble Canyon. Bagley (1986) indicated that Russian thistle densities on his plots were between 20 and 800 plants per hectare, but from casual observation, he thought the former number was more representative of the dunes as a whole. Peterson (1998a) noted Russian thistle on the north end of the Eureka Dunes and throughout Marble Canyon. Dana York also indicated that there were areas of Russian thistle infestation on the southern end of the Eureka Dunes (Dana York, Umpqua National Forest, pers. comm. 2005). In 2006, Service staff observed large amounts of Russian thistle remnants collected in depressions on the Marble Canyon Dunes and in the washes to the west of this dunes system (Croft *in litt.* 2006). They also observed lesser amounts on the Saline Spur Dune. In both cases, the remnants occurred in areas that also contained populations of Eureka Valley dunegrass. Service staff was unable to determine whether Russian thistle was occurring within populations of Eureka Valley dunegrass on the Eureka Dunes. Pavlik suggests that the presence of Russian thistle within Eureka Valley dunegrass populations may be a threat because they both require nutrients and water for growth during the same time of the year (Pavlik 1980, Pavlik and Barbour 1988, Pavlik 1994 *in* Noell 1994). We were unable to find any information to confirm this competitive relationship. Consequently, we cannot consider this as a substantiated threat at this time.

Stochastic Events

In addition to the above threats, it is possible that certain stochastic events could occur that would affect Eureka Valley dunegrass populations. These events could include violent windstorms that uproot plants, extended drought, earthquakes and/or a combination of these events with other unidentified catastrophic events. It is unlikely that the Park could institute effective management measures to prevent or reduce the effects of these events, but the presence of four separated populations allows for some protection against rangewide die-offs. The possible exception would be prolonged drought within the Eureka Valley that would likely lead to effects across the entire range of the species. The long seed viability of this species, however, would likely provide a buffer against this event if seed is retained in the seedbank. Therefore, we do not believe stochastic events to be a substantial threat.

2.4 Synthesis

At the time of listing, OHV use at Eureka Dunes was the primary threat to the Eureka Valley dunegrass. Since the time of listing, a number of land management changes have occurred in the dunes that have eliminated this threat. The land has been acquired by the Park and designated as a wilderness area which prohibits all OHV use in the plants' habitat. The Park has modified camping and access route in the area, further reducing potential impacts to the plants' habitat. Although some violations of existing vehicle closures continue to occur on a sporadic basis, there is little evidence to suggest that this is having a substantial effect in all or a significant portion of the species' range. To implement final recovery actions addressing these issues over the next year, the Service has allocated \$88,000 in "Showing Success" recovery funding for installation of signs and boundary markers to control vehicle use, restoration of OHV-damaged areas, increased visitor education, and population monitoring of the Eureka Valley dunegrass and the Eureka Valley evening-primrose.

The Park has identified horseback riding and sandboarding as a potential threat to the plant due to increases in these activities in the area. We were unable to find evidence that horseback riding and sandboarding has had a substantial adverse effect on the status of this species. The Park prohibited these activities in 2002.

Russian thistle has been observed with this species, but we were unable to find any evidence that its presence is having an adverse effect on the status of this species in all or a significant portion of its range.

Based on this synthesis, we conclude that the Eureka Valley dunegrass no longer requires the protections of the Endangered Species Act and should be delisted. Although, the Bureau and Park have not performed thorough population monitoring, it appears that the species still occupies the same range and distribution as it did prior to listing. We expect variations in population size, but the fact that the species has continued to occupy all locations since its listing indicates that it is stable. There is no evidence of current adverse effects from historically documented or potential new threats to this species. Current protection of all populations by wilderness designations and current Park management has resulted in no documented instances of adverse effects to individual plants and no effects that would substantially affect the species as a whole.

3 RESULTS

3.1 Recommended Classification

- Yes, downlist to Threatened
- Yes, uplist to Endangered
- Yes, delist
- No, no change is needed

3.2 New Recovery Priority Number 13

The new recovery priority number should be 13 because the degree of threat is now low, the recovery potential is still high, it is a monotypic genus, and the status of the species as endangered has little conflict with human activities in the area.

3.3 Listing and Reclassification Priority Number

Delisting Priority Number: 6

The delisting priority number should be a priority 6 because the status of this species as endangered has little effect on the Parks management of the Eureka Valley and this species was not petitioned for delisting.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Initiate development of a five-year post-delisting monitoring plan that includes the following:

1. Establish and initiate a monitoring program at all four populations to track changes in the spatial extent and location of the Eureka Valley dunegrass.
2. Continue monitoring and documentation of visitor use at all populations of this species, with special emphasis on tracking non-compliance issues that have an adverse effect on Eureka Valley dunegrass.
3. Establish and implement a monitoring program to track the extent, location, and relative density of Russian thistle infestations.
4. Establish and initiate a program to determine if negative competitive relationships are occurring between Russian thistle and Eureka Valley dunegrass.

Develop a management plan for the Eureka Valley that incorporates the monitoring strategies identified in the five-year post-delisting plan, and establishes specific management prescriptions for the Eureka Valley. These prescriptions should incorporate all of the management activities that are already occurring in the valley, and should also identify specific measurable objectives and adaptive management strategies to ensure continued success. Measurable objectives would identify threshold values to trigger adaptive management.

REFERENCES

- Anderson, J. 1998. Sensitive site record for the Eureka Dunes dated 7-14-98. Death Valley National Park, California.
- Bagley, M. 1986. Baseline data for a sensitive plant monitoring study on the Eureka Valley Dunes, Inyo County, California. Prepared for the U.S. Bureau of Land Management by Ecological Research Services, Claremont, California.
- Beymer, R. 1996. Notes from Rene Beymer concerning illegal off-highway vehicle activity observed on 6-24-96. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997a. Map of rare plant locations on the Saline Spur Dune dated 10/11/97. Death Valley National Park.
- Beymer, R. 1997b. Personal communication between Rene Beymer and Diane Steeck regarding illegal OHV activity reported in Marble Canyon. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997c. National Park Service incident report concerning off-highway vehicle activity at the Eureka Dunes: 4-7-97. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997d. Personal communication on 6-4-97 between Rene Beymer and Diane Steeck regarding off-highway vehicle activity seen on an aerial flyover of the dunes. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997e. National Park Service incident report concerning off-highway vehicle activity at the Eureka Dunes: 7-9-97. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997f. National Park Service incident report concerning off-highway vehicle activity at the Eureka Dunes: 8-29-97. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997g. Personal communication on 12-2-97 between Rene Beymer and Linda Greene regarding off-highway vehicle activity and vandalism seen at Eureka Dunes. Former Park botanist, Death Valley National Park, California.
- Beymer, R. 1997h. Memo from Rene Beymer to Death Valley National Park Superintendent concerning impacts from sandboarding on the Eureka Dunes. Former Park botanist, Death Valley National Park, California.

- Bureau of Land Management. 1982. A Sikes Act management plan for the Eureka Valley Dunes Area of Critical Environmental Concern and the Eureka Dunes Wildlife Habitat Management Area. Bureau of Land Management, Ridgecrest Resource Area, Ridgecrest, California.
- Croissant, T. 2005. Personal Communication between Connie Rutherford and Tim Croissant regarding prohibitions on horseback riding and sandboarding at the Eureka Dunes. Restoration Specialist, Death Valley National Park.
- Croft, Brian. 2006. Notes to the files regarding the field visit to Eureka Dunes, Death Valley National Park, on April 18-20.2006.
- Dean, L.E. 1978. *The California Desert Sand Dunes*. University of California, Riverside, Dept. of Earth Sciences Publication. 72 pp.
- Dellingers, D. 1998a. Sensitive site record for the Eureka Dunes dated 7-3-98. Death Valley National Park, California.
- Dellingers, D. 1998b. Sensitive site record for the Eureka Dunes dated 7-10-98. Death Valley National Park, California.
- Dellingers, D. 1998c. Sensitive site record for the Eureka Dunes dated 12-10-98. Death Valley National Park, California.
- Hickman, J.C. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press. Berkeley and Los Angeles, California.
- National Park Service. circa 1999. Death Valley National Park, Eureka Valley Sand Dune Accomplishments. Death Valley National Park, California.
- National Park Service. circa 2000. Summary of Eureka Dunes resource impacts: observations by non-Law Enforcement rangers. Death Valley National Park, California.
- National Park Service. 2000. Environmental Assessment for the proposed Eureka Dunes Site Improvement Project. Death Valley National Park, California.
- National Park Service. 2006. Death Valley National Park: Superintendent's Compendium of designations, closures, permits, requirements and other restrictions imposed under discretionary authority. Death Valley National Park, Death Valley, California.
- Noell, I. 1994. Status review of Eureka Valley dune grass (*Swallenia alexandrae*) and Eureka Valley evening primrose (*Oenothera californica* spp. *eurekensis*). Prepared by Bureau of Land Management, Bakersfield, for the Ventura Fish and Wildlife Office, California.

- Pavlik, B.M. 1979. The biology of endemic psammophytes, Eureka Valley, California, and its relationship to off-road vehicle impacts. California Desert Plan, BLM contract no. CA-060-CT8-000049.
- Pavlik, B.M. 1980. Patterns of water potential and photosynthesis of desert sand dune plants, Eureka Valley, California. *Oecologia* 46: 147-154.
- Pavlik, B.M. and M.G. Barbour. 1985. Demography of endemic psammophytes, Eureka Valley, California: *Seed production, dispersal and herbivory*. State of California Department of Fish and Game, Rare Plant Project, Sacramento, California.
- Pavlik, B.M. and M.G. Barbour. 1986. Demography of endemic psammophytes, Eureka Valley, California: *survivorship, seed bank dynamics, and frequency of establishment*. State of California Department of Fish and Game, Rare Plant Project, Sacramento, California.
- Pavlik, B.M. and M.G. Barbour. 1988. Demographic monitoring of endemic sand dune plants, Eureka Valley, California. *Biological Conservation* 46: 217-242.
- Peterson, A. 1998a. Personal communication with Diane Steeck- Letter and maps concerning rare plant data collected in April of 1998. Ventura Fish and Wildlife Office Ventura, California.
- Peterson, A. 1998b. Personal communication on 6-22-98 between Arnie Peterson and Diane Steeck regarding visitor use at the Eureka Dunes. Death Valley National Park, California.
- Peterson, A. 1998c. Personal communication on 3-17-98 between Arnie Peterson and Diane Steeck regarding visitor use at the Eureka Dunes. Death Valley National Park, California.
- Rods, R. 1998. Sensitive site record for the Eureka Dunes dated 7-29-98. Death Valley National Park, California.
- Rods, R. 2000. Sensitive site record for the Eureka Dunes dated 1-14-00. Death Valley National Park, California.
- Rowlands, P.G. 1982. Physical and biotic attributes of the Eureka Valley Dunes region, Eureka Valley, California. Bureau of Land Management, Ridgecrest Field Office, Ridgecrest, California.
- Rutherford, C. 2006. Personal communication with whom regarding resurvey of Mark Bagley's plots in 1988. Ventura Fish and Wildlife Listing and Recovery Coordinator, Ventura, California.
- U.S. Fish and Wildlife Service. 1982. *Eureka Valley Dunes Recovery Plan*. U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Fish and Wildlife Service. 1990. *Endangered and Threatened Species Recovery Program, Report to Congress*. Prepared by the U.S. Department of Interior, U.S. Fish and Wildlife Service, Washington, D.C.

U.S. Fish and Wildlife Service. 2005. October 2005 Recovery Data Call Spreadsheet. Ventura Fish and Wildlife Office, Ventura, California.

York, D. 2005. Personal communication with whom concerning the status of monitoring information and threats within the Eureka Valley. Former botanist for Death Valley National Park.

Appendix A: Spatial Distribution over Time

Late-1970s and Early-1980s

At the time of listing, there were four known populations within the Eureka Valley, but the majority of the distribution was on the Eureka Dunes (43 *Federal Register* 17910). When the recovery plan was written, populations were known from Marble Canyon, the sands at the base of the Saline Range (Saline Spur Dune), the Eureka Dunes, and an unnamed site 3 kilometers south of the Marble Canyon Dunes (Pavlik 1979, Service 1982, Rowlands 1982). The largest and most vigorous population was found on the massive north ridge of the Eureka Dunes, where it was found from the base of the dunes to within 50 meters of the crest.

Mid-1980s

Bagley (1986) found no change in the distribution of the Eureka Valley dunegrass on the Eureka Dunes. In addition, he was able to locate this species on the Saline Spur Dune and the Marble Canyon Dune in areas previously mapped in the recovery plan, but he did not visit the unnamed site mentioned in the recovery plan where Eureka Valley dunegrass was seen from a helicopter in 1978.

Late-1990s

Maps presented to the Service by Peterson (1998a) show a very similar distribution of Eureka Valley dunegrass in Marble Canyon to that observed by Bagley (1986). In addition, the Park mapped this species on the Saline Spur Dune in 1997 (Beymer 1997a).

2006

In April of 2006, Service staff (Brian Croft) was able to visit the Saline Spur and Marble Canyon populations and noted the presence of Eureka Valley dunegrass in areas mapped in the recovery plan and in Bagley's report. In addition, robust populations of the species can still be seen on the slopes of the Eureka Dunes.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Eureka Valley Dunegrass (*Swallenia alexandrae*)

Current Classification: Endangered
Recommendation resulting from the 5-Year Review

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number 6

Review Conducted By Brian Croft

FIELD OFFICE APPROVAL:
Lead Field Supervisor, Fish and Wildlife Service

Approve  Date 7/31/07

Acting
REGIONAL OFFICE APPROVAL:
Lead Regional Director, Fish and Wildlife Service

Approve  Date 8/29/07