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Huenneke, L.F. 1991. Ecological implications of genetic variation in plant populations. In D. Falk and K. Holsinger, eds. *Genetics and Conservation of Rare Plants*. Oxford University Press, New York.

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Turner, B.L. 1983. Status report on *Ambrosia cheiranthifolia*. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 1988. Slender rush-pea (*Hoffmannseggia tenella*) recovery plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 38 pp.

Author

The primary author of this final rule is Angela Brooks (see ADDRESSES section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal

Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Section 17.12(h) is amended by adding the following, in alphabetical order under the plant families indicated, to the List of Endangered and Threatened Plants to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *
(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Asteraceae—Aster family:						
<i>Ambrosia cheiranthifolia</i>	South Texas ambrosia	U.S.A. (TX), Mexico	E	547	NA	NA
Sterculiaceae—Cacao family:						
<i>Ayenia limitaris</i>	Texas Ayenia	U.S.A. (TX), Mexico	E	547	NA	NA

Dated: July 11, 1994.
Mollie H. Beattie,
Director, Fish and Wildlife Service.
[FR Doc. 94-20789 Filed 8-23-94; 8:45 am]
BILLING CODE 4310-65-P

50 CFR Part 17
RIN 1018-AB73
Endangered and Threatened Wildlife and Plants; Five Plants From the San Bernardino Mountains in Southern California Determined to be Threatened or Endangered

173-94

AGENCY: Fish and Wildlife Service, Interior.
ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines *Erigeron parishii* (Parish's daisy) to be threatened and *Eriogonum ovalifolium* var. *vineum* (Cushenbury buckwheat), *Astragalus albens* (Cushenbury milk-vetch), *Lesquerella kingii* ssp. *bernardina* (San Bernardino Mountains bladderpod), and *Oxytheca parishii* var. *goodmaniana* (Cushenbury oxytheca) to be endangered pursuant to the Endangered

Species Act of 1973, as amended (Act). These five plant species are endemic to the carbonate deposits (limestone and dolomite) of the San Bernardino Mountains, San Bernardino County, California. Most of the carbonate deposits in this mountain range are within actively used mining claims or mining claims that are being maintained for their mineral resources. Limestone, ranging from cement grade to pharmaceutical grade, is currently mined in the area; dolomite is not currently mined. The open or terraced mining techniques that are used, as well as associated overburden dumping and road construction, result in destruction of the plants' habitat. Other threats to the plants include off-highway vehicle use, urban development near the community of Big Bear, expansion of a ski area, and energy development projects. Several of the plants are also threatened with stochastic extinction due to the small numbers of populations or total number of individuals. This rule implements the Federal protection and recovery provisions afforded by the Act for these five plants.

EFFECTIVE DATE: September 23, 1994.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Ventura Field Office, 2140 Eastman Avenue, Suite 100, Ventura, California 93003.

FOR FURTHER INFORMATION CONTACT: Carl Benz at the above address or at (805) 644-1766.

SUPPLEMENTARY INFORMATION: Background

The San Bernardino Mountains in southern California have been recognized for supporting a wide diversity of natural habitats that have resulted from their geographic position between desert and coastal environments, elevational zonation, and uncommon substrates such as limestone outcrops. The San Bernardino National Forest (Forest), which encompasses most of the San Bernardino Mountains, constitutes less than 1 percent of the land area of the State, yet contains populations of over 25 percent of all plant species that occur naturally in California.

Outcrops of carbonate substrates, primarily limestone and dolomite, occur

in several bands running on an east-west axis along the desert-facing slopes of the San Bernardino Mountains, with disjunct patches occurring just to the south of Sugarlump Ridge and to the east as far as the Sawtooth Hills. These outcrops are a remnant of an ancient formation of sandstone, shale, and limestone, through which the granitic core of the Transverse Ranges has emerged (Fife 1988).

The five taxa under discussion, *Erigeron parishii* (Parish's daisy), *Eriogonum ovalifolium* var. *vineum* (Cushenbury buckwheat), *Astragalus albens* (Cushenbury milk-vetch), *Lesquerella kingii* ssp. *bernardina* (San Bernardino Mountains bladderpod), and *Oxytheca parishii* var. *goodmaniana* (Cushenbury oxytheca), are restricted primarily to carbonate deposits or soils derived from them. These taxa, and other plants that occur on carbonate deposits, have commonly been referred to as "limestone endemics" by botanists, whether they occur on limestone or dolomite (Krantz 1990, Schoenherr 1992). Collectively, these five taxa span a range approximately 56 kilometers (km) (35 miles) long, ranging in elevation from 1,220 meters (4,000 feet (ft)) at the base of the mountains to approximately 2,440 meters (8,000 ft), and occur as components in the understory of a variety of plant communities, including Jeffrey pine-western juniper woodland, pinyon-juniper woodland, pinyon woodland, Joshua tree woodland, blackbrush scrub, and desert wash.

Pinyon-juniper woodland communities dominate the desert-facing slopes above 1,220 meters (4,000 ft) in elevation, and grade into a Joshua tree woodland at lower elevations (Vasek and Thorne 1988). Pinyon-juniper woodlands extend up to almost 2,100 meters (7,000 ft) in elevation, where they intergrade with a Jeffrey pine woodland on drier sites or mixed conifer forest on wetter sites. Open forests of lodgepole pine and limber pine are found at the highest elevations. A wide variation in the species composition exists within the pinyon-juniper woodland. *Pinus monophylla* (pinyon pine) or *Juniperus osteosperma* (Utah juniper), and more rarely *Juniperus occidentalis* (western juniper) or *Juniperus californica* (California juniper), are the structurally dominant species, occasionally occurring together. Holland (1986) has referred to separate Mojavean pinyon woodland and Mojavean juniper woodland and scrub communities. The understory varies with slope and elevation, but typically includes species such as *Cercocarpus ledifolius* (mountain mahogany),

Ephedra viridis (Mormon tea), *Yucca schidigera* (Mohave yucca), *Yucca brevifolia* (Joshua tree), and *Encelia virginensis* (encelia). Patches of local dominance by *Coleogyne ramosissima* (blackbrush) on lower elevation desert facing slopes, or *Arctostaphylos* sp. (manzanita) on more interior canyons, are common.

Erigeron parishii is a small perennial herb of the aster family (Asteraceae) that reaches 1 to 3 decimeters (dm) (4 to 12 inches (in)) in height. The linear leaves are covered with soft, silvery hairs. Up to 10 solitary flower heads are borne on cauline stalks; ray flowers are deep rose to lavender, and heads have greyish green and glandular phyllaries. *E. parishii* was first described by Asa Gray in 1884 based on specimens collected by Samuel B. Parish in Cushenbury Canyon in 1881. *E. parishii* has sometimes been confused with *E. utahensis*, a plant found on carbonate substrates in the mountains of the Mojave Desert and in Utah, Colorado, and Arizona, but differs from the latter in the structure of the pappus and its silvery-white rather than grey-green stem.

Erigeron parishii is the most widely ranging of the five taxa discussed herein, with a range 56 km (35 miles) long. The plant is known from fewer than 25 occurrences, with the total population numbering approximately 16,000 individuals. Fewer than a third of the occurrences comprise more than 1,000 individuals each (Barrows 1988a). From White Knob at the western terminus, populations occur primarily along the belt of carbonaceous substrates, southeast to Pioneertown. The plant is typically found associated with pinyon woodlands, pinyon-juniper woodlands, and blackbrush scrub from 1,220 to 1,950 meters (4,000 to 6,400 ft) in elevation. It is usually found on dry rocky slopes, shallow drainages, and outwash plains on substrates derived from limestone or dolomite. Some populations occur on a granite/limestone interface, usually a granitic parent material overlain with an outwash of limestone materials. Two small outlying populations at the eastern edge of its range near Pioneertown occur on quartz monzonite substrates. Historic occurrences were recorded from Rattlesnake Canyon south of Old Woman Springs and from the Little San Bernardino Mountains; these locations have not been surveyed in over 50 years and merit additional field surveys (Andy Sanders, University of California, Riverside, pers. comm., 1992).

Eriogonum ovalifolium var. *vineum* is a low, densely-matted perennial of the

buckwheat family (Polygonaceae). The flowers are whitish-cream, darken to a reddish or purple color with age, and are borne on flowering stalks reaching 1 dm (4 in) in height. The plant flowers from May through June. The round to ovate leaves are white-woolly on both surfaces and are 0.7 to 1.5 centimeters (cm) (0.3 to 0.6 in) long. The diameter of mats is typically 1.5 to 2.5 dm (6 to 10 in), but may reach up to 5 dm (20 in) in particularly well-developed individuals.

Eriogonum ovalifolium var. *vineum* was first collected by S.B. Parish near Rose Mine, San Bernardino Mountains, in 1894, and was described as *E. vineum* by John K. Small in 1898. In 1911, Aven Nelson published the combination *E. ovalifolium* var. *vineum*. Jepson in his manual used the combination of *E. ovalifolium* var. *vineum* in 1943. Munz (1959) accepted the work of Stokes (1936), and recognized it as *E. ovalifolium* ssp. *vineum*, in his flora of California. In 1968, Reveal clarified the relationship of the plant to *E. ovalifolium* var. *nivale*, with which it had been confused, and used the name *E. ovalifolium* var. *vineum* (Reveal and Munz 1968). Three other varieties of *E. ovalifolium* are distinguished on the basis of floral and leaf characteristics, but none of them occur in the San Bernardino Mountains.

Eriogonum ovalifolium var. *vineum* is limited in distribution to the belt of carbonate substrates of the north slopes of the San Bernardino Mountains. The plant is currently known from approximately 20 occurrences over a distance of about 40 km (25 miles). Only a quarter of those occurrences comprise more than 1,000 individuals each (Barrows 1988b), with the total population numbering approximately 13,000 individuals. *E. ovalifolium* var. *vineum* occurs from the White Knob area east to Rattlesnake Canyon. Surveys by Barrows (1988b) resulted in a slight range extension of the plant in the Rattlesnake Canyon drainage. Since publication of the proposal, additional surveys by the Forest staff located two previously unknown populations, one near Jacoby Springs and one just north of Mineral Mountain (CNDDDB 1992). Tierra Madre Consultants (TMC) located a previously unknown population west of White Knob (TMC 1992), which extends the known range of the plant west by 1.6 km (1 mile). A dozen other extensions of existing occurrences were reported by the Forest Service and TMC; all of these were within the known range of the plant (CNDDDB 1992, TMC 1992).

Eriogonum ovalifolium var. *vineum* occurs within openings of pinyon

woodland, pinyon-juniper woodland, Joshua tree woodland, and blackbrush scrub communities between 1,400 and 2,400 meters (4,600 and 7,900 ft) in elevation. Other habitat characteristics include open areas with little accumulation of organic material, a canopy cover generally less than 15 percent, and powdery fine soils with rock cover exceeding 50 percent. The plant typically occurs on moderate slopes, although a few occurrences are on slopes over 60 percent. On milder, north-facing slopes, it co-occurs with *Astragalus albens*.

Recent fieldwork by Howard Brown (Pluess-Stauffer Inc., *in litt.*, 1992) has refined the information on the carbonate geology of the San Bernardino Mountains. *Eriogonum ovalifolium* var. *vineum* clearly occurs on limestone substrate in the White Knob area, and from Arctic/Bousic Canyon west to Terrace Springs, south to Top Spring, and along the north side of Lone Valley to Tip Top Mountain. However, *E. ovalifolium* var. *vineum* occurs on dolomite in the Bertha Ridge area, north Holcomb Valley, Jacoby Canyon, and along Nelson Ridge, according to Brown (*in litt.*, 1992). Additionally, a population just to the south of Mineral Mountain is clearly on non-carbonate substrates; a population in Furnace Canyon seems to be on a mixed lithology of granite, limestone, and dolomite; and a population on Heartbreak Ridge is on carbonate substrate.

Astragalus albens is a small silvery-white perennial herb in the pea family (Fabaceae). The slender stems are decumbent, grow to 30 cm (12 in) in length, and support leaves comprised of 5 to 9 small leaflets. The purple flowers, which bloom from March to May, occur toward the ends of the branches in 5- to 14-flowered racemes and develop 8- to 11-seeded pods. In 1885, *A. albens* was described by Edward L. Greene based on a collection made by Parish and Parish 3 years earlier (Greene 1885). In 1927, Per Axel Rydberg published the name *Hamosa albens* (Rydberg 1927). In 1964, R.C. Barneby synonymized the genus *Hamosa* and included the species in *Astragalus* (Barneby 1964). *A. leucolobus*, a common associate on carbonate soils, is distinguished from *A. albens* by its cobwebby pubescence on the leaflets, which are strongly folded along the midrib, and differently shaped pods.

Astragalus albens is currently known from fewer than 20 occurrences scattered throughout the eastern half of the carbonate belt, running from Furnace Canyon southeast to the head of Lone Valley, a range of 24 km (15

miles). The proposal stated that the total number of individuals was estimated at 2,000, but that this number is likely to be greater in years of substantial rainfall. Several known populations comprised a larger number of individuals during the 1992 field season than had previously been reported. That may, in part, be due to favorable rainfall during March 1992, which resulted in a large establishment of seedlings, and in part to a more thorough survey effort. Of significance is the extension of a population in the Top Spring-Smarts Ranch Road area; several thousand individuals were found in this area, making it the primary population center for the species. Population estimates for 1992 place the total number of individuals between 5,000 and 10,000.

The plant is typically found on carbonate substrates along rocky washes and gentle slopes within pinyon woodland, pinyon-juniper woodland, Joshua tree woodland, and blackbrush scrub communities. *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum* co-occur with *Astragalus albens* at several locations. Most occurrences are found between 1,500 and 2,000 meters (5,000 and 6,600 ft) in elevation on soils derived directly from decomposing limestone bedrock. Three occurrences are found below 1,500 meters (5,000 ft) in elevation in rocky washes that have received limestone outwash from erosion higher in the drainages. According to Brown (*in litt.*, 1992), two populations occur on granite substrates (Gordon Quarry and Granite Peaks), and one occurs on granite and quartzite (Cactus Flat). Other habitat characteristics include an open canopy cover with little accumulation of organic material, rock cover exceeding 75 percent, and gentle to moderate slopes (5 to 30 percent).

Lesquerella kingii ssp. *bernardina* is a silvery, short-lived perennial member of the mustard family (Brassicaceae) reaching 1 to 2 dm (4 to 8 in) in height. The plant has yellow flowers located toward the ends of the stems. The basal leaves are ovate and have long petioles. The type material was collected by Frank W. Peirson at the east end of Bear Valley in 1924. In 1932, Munz described this plant as *L. bernardina*. In 1958, Munz combined *L. bernardina* with *L. kingii*, and made the combination of *L. kingii* ssp. *bernardina* (Wilson and Bennett 1980). *L. kingii* ssp. *kingii* is found in the mountains of the eastern Mojave Desert and the Inyo-White ranges extending into Nevada. It is distinguished from *L. kingii* ssp. *bernardina* by its smaller petals and styles.

Lesquerella kingii ssp. *bernardina* is currently known from two areas, on either side of Bear Valley. One cluster of occurrences is on the north side of the valley, near the east end of Bertha Ridge, adjacent to the community of Big Bear, and is subject to impacts from urbanization. The other cluster is centered on the north-facing slope of Sugarlump Ridge to the south of the valley, approximately 10 km (6 miles) south of the Bertha Ridge occurrences. These latter occurrences were discovered during spring 1990 on an existing downhill ski run, and on and adjacent to proposed ski runs and lift lines within an existing ski area (California Natural Diversity Data Base (CNDDB) 1990). The estimate of total number of individuals in the Bertha Ridge occurrences was 25,000 in 1980 and less than 10,000 in 1988; it is unclear whether this was due to differences in sampling techniques or drought conditions (Wilson and Bennett 1980, CNDDB 1990). In 1991, the Sugarlump Ridge populations totalled approximately 10,000 individuals (CNDDB 1991).

The habitat for *Lesquerella kingii* ssp. *bernardina* is characterized by carbonate substrates, either brown sandy soils with white carbonate rocks or outcrops of large carbonate rock. According to geologic information supplied by Brown (*in litt.*, 1992), all populations of *L. kingii* ssp. *bernardina* both in the Bertha Ridge and the Sugarlump Ridge areas occur on dolomite. Slopes are typically gentle to moderate and are both north- and south-facing between 2,100 and 2,700 meters (6,800 and 8,800 ft) in elevation. Within Jeffrey pine-western juniper woodlands, as well as white fir forest in some locations, the subspecies is found in open areas with little accumulation of organic material. The plant seems to be tolerant of slight disturbance; scattered plants were found growing on old roads, undeveloped lots, and undeveloped yards within the Whispering Forest housing tract (Myers and Barrows 1988). However, the plant is conspicuously absent from heavily graded and mulched ski runs in the Bear Mountain ski area.

The carbonate substrates that support *Lesquerella kingii* ssp. *bernardina* lie south and west of those that support most of the populations of the other four taxa under discussion. However, near the east end of Bertha Ridge, the southernmost population of *Eriogonum ovalifolium* var. *vineum* occurs in close proximity to one colony of *Lesquerella kingii* ssp. *bernardina*.

Oxytheca parishii var. *goodmaniana* is a small wiry annual of the buckwheat

family (Polygonaceae). The type material was collected by Parish and Parish in 1882 near Cushenbury Spring. For a number of years, historical collections were mistakenly identified as *O. parishii* var. *abramsii* or *O. watsonii*. Barbara Ertter (1980) described the variety in honor of George J. Goodman, who was the first to recognize both the distinctiveness of the variety and its close relationship to *O. parishii*. *O. parishii* var. *goodmaniana* stands 0.5 to 3 dm (2 to 12 in) tall with a basal rosette of leaves 1 to 3 cm (0.4 to 1.2 in) long and stems with bracts at the nodes. The flowers consist of 6 small white to rose or greenish-yellow petals; clusters of 3 to 12 flowers are subtended by a distinct involucre bract. *O. parishii* var. *goodmaniana* is separated from the other three varieties of *O. parishii* by the presence of only four to five awns on the bracts, rather than seven or more.

Oxytheca parishii var. *goodmaniana* is the most restricted of the carbonate endemic species of the San Bernardino Mountains. Forest Service surveys in 1992 located three additional populations, bringing the total number of known occurrences to seven (CNDDDB 1992). One location near Cushenbury Spring is located near an active limestone mine; two more occurrences are located near the abandoned Green Lead gold mine, one of which is bisected by a road; the fourth occurrence is located near the north side of Holcomb Valley. The three newly discovered populations are located along the Helendale Fault in the vicinity of Tip Top Mountain, Mineral Mountain, and Rose Mine. This represents a significant extension of approximately 19 km (12 miles) to the southeast from the previously known range of the plant. Given the availability of potentially suitable habitat between the newly discovered and the previously known populations, other sites supporting this taxon may be found with additional surveys.

With the exception of the north Holcomb Valley population, which occurs on dolomite, all populations of *Oxytheca parishii* var. *goodmaniana* occur on limestone or a mixed lithology of limestone and dolomite (TMC 1992). In 1990, the total known population consisted of fewer than 3,000 individuals. With discovery of the new populations, however, current estimates have been doubled. Since it is an annual species, the number of individuals might be higher in years with winter and spring rainfall and temperatures favorable to seed germination and seedling establishment. The low number of occurrences, however, as well as

individuals, also subjects the species to the possibility of stochastic extinction.

Previous Federal Action

Federal action on three of the five plants began when the Secretary of the Smithsonian Institution, as directed by section 12 of the Act, prepared a report on those native U.S. plants considered to be endangered, threatened, or extinct in the United States. This report (House Document No. 94-51), which included *Erigeron parishii* and *Lesquerella kingii* ssp. *bernardina* as threatened and *Eriogonum ovalifolium* var. *vineum* as endangered, was presented to Congress on January 9, 1975. On July 1, 1975, the Service published a notice in the **Federal Register** (40 FR 27823) accepting the report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act and of the Service's intention thereby to review the status of the plant taxa named therein, including *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Lesquerella kingii* ssp. *bernardina*.

The Service published an updated notice of review for plants on December 15, 1980 (45 FR 82480). This notice included *Eriogonum ovalifolium* var. *vineum* and *Lesquerella kingii* ssp. *bernardina* as category 1 candidates (species for which the Service has substantial information on biological vulnerability and threat to support proposals for listing) and *Erigeron parishii* as a category 2 candidate (species for which data in the Service's possession indicate listing is possibly appropriate, but for which substantial information on biological vulnerability and threats is not currently available to support proposals for listing).

On February 15, 1983 (48 FR 6752), the Service published a notice of its prior finding that the listing of *Eriogonum ovalifolium* var. *vineum* and *Lesquerella kingii* ssp. *bernardina* is warranted but precluded in accordance with section 4(b)(3)(B)(iii) of the Act, as amended in 1982. Pursuant to section 4(b)(3)(C)(i) of the Act, the finding must be recycled on an annual basis, until the species is either proposed for listing or the petitioned action is found to be not warranted. In October 1983, 1984, 1985, 1986, 1987, 1988, 1989, and 1990, further findings were made that the listing of *Eriogonum ovalifolium* var. *vineum* and *Lesquerella kingii* ssp. *bernardina* was warranted, but that the listing of these species was precluded by other pending proposals of higher priority. In the September 27, 1985 (50 FR 39526), and February 21, 1990 (55 FR 6184), plant notices of review, *Eriogonum ovalifolium* var. *vineum* and *Lesquerella kingii* ssp. *bernardina* were

again included as category 1 candidates, and *Erigeron parishii* as a category 2 candidate. The February 21, 1990, notice also included *Astragalus albens* in category 1 and *Oxytheca parishii* var. *goodmaniana* in category 2. Since publication of that notice, additional survey work was completed for *Oxytheca parishii* var. *goodmaniana*, providing new information on the status of that species. Similarly, the Service was made aware of increased threats to *Erigeron parishii*, in the form of two new pending mining operations that would likely adversely impact this species. As a result, on November 19, 1991 (56 FR 58332), the Service published a proposed rule in the **Federal Register** to list the five plants as endangered.

Summary of Comments and Recommendations

In the November 19, 1991, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information relevant to a final decision on the listing proposal. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Requests for a public hearing were received from eight parties, primarily mining industry representatives, but also including the National Inholders Association and the Bear Mountain Ski Resort. As a result, on May 15, 1992, and again on May 26, 1992, the Service published notices in the **Federal Register** (57 FR 20805 Bernardino Sun and the Barstow Desert Dispatch). Requests for a public hearing were received from eight parties, primarily mining industry representatives, but also including the National Inholders Association and the Bear Mountain Ski Resort. As a result, the Service conducted a hearing on June 3, 1992, at the San Bernardino County Government Center in San Bernardino. Testimony was taken from 1 p.m. to 4 p.m., and from 6 p.m. to 8 p.m., with 21 parties presenting testimony.

During the comment periods, the Service received written and oral comments from 51 parties. Multiple comments were received from mining industry representatives, both during and after the closure of the comment periods. The California Department of Fish and Game, The Nature Conservancy, California Native Plant Society, Audubon Society, Sierra Club, Natural Heritage Foundation, Center for Plant Conservation, Rancho Santa Ana Botanic Garden, University of California Natural Reserve System, and the Forest Service were 10 of 36 commenters

expressing support for the listing proposal. Eleven commenters, including seven mining industry representatives, two multiple-use groups, and one assemblyman opposed the listing. The Bureau of Mines initially opposed the listing during the public comment period. However, oral testimony at the public hearing by a Bureau of Mines representative indicated a more neutral stance and an offer to assist in data analysis to be used in the development of a Forest Service habitat management guide for the five taxa. Most of those opposed to the listing also asked for a 6-month extension to the rulemaking process to allow results of additional surveys completed during the 1992 field season to be included in the final determination. Four commenters were neutral, including a Congressman, one county supervisor, and the Big Bear Chamber of Commerce. In addition, results of additional surveys for the plants (CNDDDB 1992, TMC 1992) and additional biological information that was submitted to the Service since publication of the proposal have been incorporated into this final rule. Opposing comments and other comments questioning the rule have been organized into specific issues. These issues and the Service's response to each are summarized as follows:

Issue 1: Numerous comments were received concerning the Service's reference to the five plants as "limestone endemics" in the proposal. This reference appears to be of great concern to the mining industry because a number of populations occur on dolomite, quartz monzonite, granite, or mixed lithologies of these substrates, and not solely on limestone, in the strict sense. Other commenters focused on the Service's use of inaccurate geologic maps that indicated that substrates at particular plant locations were limestone, while maps currently being revised by the U.S. Geological Survey (USGS) will indicate that substrates in those locations may actually consist of dolomite or other rock types. Many of these commenters believe that more accurate geologic data would disprove the hypothesis that these plants are "limestone endemics."

Service Response: According to the Dictionary of Geologic Terms, one definition of "limestone" is given as "(A) general term for that class of rocks that contain at least 80 per cent of the carbonates of calcium or magnesium" (American Geologic Institute 1976). Apparently in keeping with this definition, the USGS map for the Lucerne Valley quadrangle (7.5 minute series) referred to the Furnace Limestone unit as being comprised of

white carbonate rocks, grey carbonate rocks, quartzite, and phyllite—metasedimentary rocks of Paleozoic age (USGS 1964). Similarly, the California Division of Mines and Geology map for the San Bernardino quadrangle (1:250,000) refers to the same units as upper Paleozoic limestone and marble, and Cambrian and uppermost Precambrian crystalline limestone (California Division of Mines and Geology 1986). These maps represent the best information available to the Service. The colloquial use of the term "limestone endemic" to refer to the five taxa under discussion is based, in part, on the generic use of the term "limestone" by geologists and botanists. While intending to use "limestone" as a generic term, the Service erred in the proposal by referring to such substrates as calcium carbonate deposits, rather than simply carbonate deposits. The term calcium carbonate, or limestone in the more technical sense, refers to carbonate with a high percent of calcium, as differentiated from dolomite, which is carbonate with a high percent of magnesium. The Service has used more precise descriptions of substrate type in this rule and generally refers to these species as "carbonate endemics." The Service looks forward to any additional information that the revised USGS maps will provide.

Issue 2: Numerous commenters contended that the plants are not endemic to the 35-mile range of the north slope of the San Bernardino Mountains but are also found to the east and west of that range and in mountain ranges of the Mojave Desert. Several commenters indicated that geologists had observed several of the taxa in the New York Mountains.

Service Response: The record of botanical collections and surveys from the San Bernardino Mountains and the Mojave Desert ranges is more than adequate to establish general ranges of the plants. Additional surveys were conducted in 1992 in four mountain ranges in the east Mojave Desert, in the San Bernardino Mountains, and in the San Gabriel Mountains to determine any range extensions for the five taxa. Only one of the four new populations of *Erigeron ovalifolium* var. *vineum* was located outside of the known range and this was within a mile of known locations. The Forest Service also conducted additional surveys in 1991 and 1992 for all five taxa, which resulted in a significant range extension for *Oxytheca parishii* var. *goodmaniana*. However, with the exception of the range extension for *Oxytheca parishii* var. *goodmaniana*, the newly located populations do not represent significant

new biological or distributional data affecting the status of the remaining four plants. Although the new range extension for *Oxytheca parishii* var. *goodmaniana* is considered significant, the taxon is still so limited in distribution that listing as endangered is still appropriate. In addition, no unthreatened populations were discovered.

Issue 3: Numerous commenters contended that surveys for the plants were not adequate or up-to-date, that the plants have only been found on limestone because only limestone substrates were targeted for surveys, and that the discovery of additional populations with each new survey indicates that the plants are more widespread than previously thought. Some commenters stated that the surveys were performed by "biased individuals" whose unpublished reports had not been subject to peer review, and that information on which the proposal was based constituted "junk science." Other commenters stated that the existing knowledge of the plants was more than adequate to proceed with listing, and that a 6-month extension for the purpose of collecting additional information on the range and distribution of the plants, as requested by the mining industry, was unnecessary.

Service Response: Botanists have been collecting plants in southern California for scientific study for over 150 years; all five plants were originally collected at least 100 years ago. Carbonate substrates in particular have been the focus of numerous surveys because botanists have recognized that these nutrient-deficient substrates often support unique taxa. As early as 1979, the Forest Service performed rangewide surveys of three of the taxa (*Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Lesquerella kingii* ssp. *bernardina*). Moreover, since 1979, the Forest Service has conducted surveys of almost all ground-disturbing projects on the San Bernardino National Forest to determine project impacts to species considered to be sensitive and has performed botanical investigations of at least 25 taxa. The surveys have been conducted on numerous substrates and throughout the geographic range of the San Bernardino and adjacent National Forests, including the San Bernardino, San Gabriel, and San Jacinto Mountains. While the Service recognizes that new occurrences may be discovered through additional surveys, the body of information is adequate to proceed with this listing. The Service accepts the reliability of the surveys performed and

considered this information the best scientific information available.

Issue 4: Several commenters charged that the Service ignored results of propagation studies on *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum* performed by Rancho Santa Ana Botanic Garden that indicate that 1) the two plants do not require limestone, and 2) the plants are easy to propagate from seeds and cuttings. The industry believes these results show a potential for successful reclamation after mining.

Service Response: The Service is fully aware of the propagation efforts for two of the species (*Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum*) by Rancho Santa Ana Botanic Garden researchers (Mistretta 1991). However, germination or survival under horticultural conditions does not accurately represent conditions required for long-term survival in the wild. Other efforts to propagate *Erigeron parishii* from seed have met with less success (Forest Service 1992). The results of these studies are preliminary and inconclusive, and the long-term viability of species under cultivation is questionable. In addition, the normal life histories and other habitat characteristics of substrate endemics typically are not maintained in horticultural settings.

The success rate for salvage of *Eriogonum ovalifolium* var. *vineum* from the Gordon Quarry was less than 50 percent (Forest Service 1992). Although some potential for reclamation with these species after mining may exist, the purpose of the Act is to conserve ecosystems upon which listed species depend. Reintroduction is a potentially important recovery tool, but it has not been shown to restore mine sites to pre-disturbance conditions that would ensure the long-term survival of such plants and, therefore, does not preclude the need to list the species.

Issue 5: Several commenters were concerned that important information concerning the potential for reclamation of mined sites was not included in the proposal. They claim that three of the plants (*Astragalus albens*, *Erigeron parishii*, and *Eriogonum ovalifolium* var. *vineum*) are opportunistic, weedy intruders, or invaders. As evidence, they cited the Barrows surveys that document populations occurring on roadbeds, roadcuts, and quarry benches. They also state that accompanying notes indicate populations in these disturbed habitats are more vigorous or more dense than those on adjacent pristine areas, and the plants appear to tolerate light disturbances. Some commenters indicated that old roadbeds, roadcuts, and old quarry benches constituted

more than "lightly disturbed" habitat, and that the plants in fact can recolonize heavily disturbed sites. One commenter stated that "the effects of mining as a possible positive influence" had not been considered.

Service Response: The Service did not reference *Astragalus albens*, *Erigeron parishii*, and *Eriogonum ovalifolium* var. *vineum* growing on old roadbeds, roadcuts, and quarry benches because, in most cases, these plants did not constitute independent self-perpetuating populations, but rather scattered individuals that had dispersed into disturbed habitat from adjacent populations on undisturbed habitat. The Forest Service has noted that *Eriogonum ovalifolium* var. *vineum* and *Erigeron parishii* have colonized infrequently used roads at three sites, and small quarries at two sites, each of which is less than 1 hectare (2 acres) in size, have been abandoned for 20 to 25 years, and had small patches of native vegetation left within them at the time of mining. In contrast, no colonization by any of the five plants has been observed in the larger quarries. Furthermore, Forest Service surveys at the Right Star site for *Astragalus albens* indicate that the mean density of individuals in disturbed areas is significantly lower than that in adjacent undisturbed areas (137 versus 679 per acre) (Forest Service, *in litt.*, 1992).

Initial flushes of recolonization by plants may occur in response to light and very intermittent disturbance. The mechanism under which recolonization occurs and its role in the long-term survival of the five species is unknown. Research on recolonization may indicate that the species can recolonize areas to aid in their long-term survival. However, data do not indicate that these plants have extensive recolonization capabilities. Heavily disturbed sites, (i.e., those stripped to bedrock with little residual fine-textured substrates, and with no nearby islands of native vegetation from which plants can recolonize) do not show any levels of successful recolonization.

Several recent reports document *Erigeron parishii* occurring on tailing slopes (Brown, *in litt.*, 1992). Recent observations by an interagency reclamation review team that visited all four current quarry operations on the north slope of the San Bernardino Mountains found that *Salsola* sp. (Russian thistle) was the most prevalent plant on tailing slopes and road berms (Forest Service 1992). *Erigeron parishii* or the other taxa under discussion on even "lightly disturbed" sites may or may not represent independent self-perpetuating populations.

Issue 6: Several commenters stated that a lack of understanding of mining operations has led to a premature conclusion about the impact of mining on plant habitat. One commenter noted that a block of mining claims does not represent the actual area that would be disturbed during mining operations. Brown (*in litt.*, 1992), who recently remapped the geology of the San Bernardino quadrangle in collaboration with USGS, stated that about 2 percent of the limestone in the San Bernardino Mountains is of commercial value and would be subject to mining within the next 75 years. The remaining limestone will not be mined, though virtually all of it is under claim.

Service Response: The impact of mining on plant habitat is not restricted to the quarry site itself, but includes loss of habitat through overburden (materials that need to be removed to reach the underlying limestone, as well as the low-grade limestone that is currently not being marketed) dumping, tailing dumping, road construction (including sidelaying), and exploratory mining activity, which may constitute a surface disturbance several times the size of the quarry. Additional biological values of the habitat may be lost through habitat fragmentation, alteration of hydrology, and an increase in airborne particulates that may depress pollinator success.

Aside from whether the extent of primary and secondary impacts of mining on plant habitat are being accurately assessed, the threat that exists to plant habitat from the mere presence of mining claims must be considered. According to the Mining Law of 1872 (30 U.S.C. 22 *et seq.*), a claimholder must have a sincere intent to mine; in fact, a claim can be legally seized by another party if the original claimholder is shown not to meet this requirement. No mechanisms are currently available to Federal land management agencies making regulatory decisions to protect sensitive natural resources on lands that are under claim. This situation is discussed more thoroughly under Factor D below.

Issue 7: A few commenters stated that the Endangered Species Act addresses species, and not varieties or subspecies. Therefore, if the range of the three species (*Eriogonum ovalifolium*, *Lesquerella kingii*, and *Oxytheca parishii*), which includes the Sierra Nevada Mountains, the desert mountain ranges, Oregon, and Nevada, is considered, none of the varieties or subspecies of these three plants could be considered endangered under the Act.

Service Response: Section 3(15) of the Act states that "The term 'species'"

includes any subspecies of fish or wildlife or plants. * * * In response to concerns from the Smithsonian Institution that the definition included subspecies but not varieties, the Service published regulations on April 26, 1978 (43 FR 17912) that discussed common use of both terms by botanists and recognized plant "varieties" as equivalent to "subspecies" and, therefore, "species," as defined by the Act.

Issue 8: A few commenters thought that the five taxa do not meet the definition of "endangered" according to the Act. Similar comments stated that the taxa are so "regenerative" and so common they could never be endangered, farmers in Lucerne Valley have been trying to eradicate *Astragalus albens* for years without success, the California Department of Fish and Game has not listed these taxa as rare, and the only reason the taxa were being proposed for listing was to satisfy the California Native Plant Society lawsuit agreement.

Service Response: Although additional survey data and information on threats posed to the five plant taxa by mining were presented to the Service, none of the information contradicted the Service's contention that the five taxa are threatened by mining and other potential impacts in the San Bernardino Mountains (see Factor A in Summary of Factors Affecting the Species). In fact, a report submitted on behalf of the mining industry (TMC 1992) confirmed the limited distribution of these five taxa. For example, in the TMC report, the greatest increase in population size for any of the five taxa surveyed amounted to less than 2 percent for *Eriogonum ovalifolium* var. *vineum* and occurred primarily within the currently known range of the plant. Thus, the Service has concluded that the distribution of the five species was sufficiently well known prior to the proposed listing, and has not significantly changed with additional survey results. The comment concerning the commonness of *Astragalus albens* in Lucerne Valley is evidently a case of mistaken identity; *A. albens* has never been recorded from the Valley.

The procedures for designating species as threatened or endangered are outlined in section 4(a)(1) of the Act and promulgated regulations (50 CFR part 424). As discussed earlier in this rule, Federal action on several of these taxa began as early as 1975. While the California Native Plant Society lawsuit settlement may have accelerated the rate at which California plant species have been proposed for listing, the suit does

not change the standards by which species are evaluated for potential listing. Moreover, preparation of the proposal was essentially completed prior to the California Native Plant Society settlement agreement. Although the State has not pursued listing any of these taxa, the California Department of Fish and Game has clearly stated its support for the listing of all five taxa and has provided a substantial amount of information to the Service that was used in preparation of this final rule.

Based upon information the Service has received regarding the status and distribution of these five species, including data from the Forest Service, The Nature Conservancy, local botanists, private consultants, and mining industry, the Service believes that the listing of these plants is warranted. The Service finds that *Astragalus albens*, *Eriogonum ovalifolium* var. *vineum*, *Lesquerella kingii* ssp. *bernardina*, and *Oxytheca parishii* var. *goodmaniana* are in danger of extinction throughout all or a significant portion of their ranges and, therefore, fit the definition of endangered as defined in the Act. *Erigeron parishii* has the widest range and largest number of populations of the species proposed herein for listing; moreover, several populations are known to occur on non-carbonate substrates that are not under claim. However, a large portion of its range is under mining claims, and only the population at the Burns Reserve currently has any permanent protection. Therefore, it is likely to become endangered in the foreseeable future and fits the definition of threatened as defined in the Act.

Issue 9: Several commenters stated that the effects of drought on the plants had not been considered in the proposal, implying that the plants would not be considered rare if surveys were performed during non-drought years when the species were more abundant. One commenter felt that the effects of drought should be studied and quoted Rupert Barneby who, when describing *Astragalus albens*, wrote " * * * in years of low rainfall, * * * the populations become decimated or even annihilated except for dormant seeds. In the first spring after a drought of several seasons duration, whole colonies of young plants can be found in prolific flower * * *" (Barneby 1964).

Service Response: It is well known that drought will reduce both vigor and abundance of annual as well as short-lived or herbaceous perennial species. In the same sentence that was quoted above, Rupert Barneby wrote that

" * * * the plants flower precociously; and a good proportion of them are probably monocarpic, especially in years of low rainfall * * *" (Barneby 1964). Monocarpic plants, those which flower and fruit once and then die, may be particularly subject to the vagaries of climate, especially in regions that are typically arid. Seed for these plants may persist in the soil for years before favorably climatic conditions allow for successful seedling germination and establishment. This habit points out the need to maintain undisturbed habitat for the plants to accommodate the "boom and bust" cycles in population sizes. While the Service agrees that it would be interesting to study the effects of drought on the fluctuations in plant population sizes, the ranges of all five plants under discussion are small and their habitat currently receives little protection. Reference to the effects of drought on *Astragalus albens* and *Lesquerella kingii* ssp. *bernardina* is included in this rule in the Background section and under Factor E in the Summary of Factors Affecting the Species.

Summary of Factors Affecting the Species

Section 4 of the Endangered Species Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal Lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Erigeron parishii* Gray (Parish's daisy), *Eriogonum ovalifolium* Nuttall var. *vineum* (Small) A. Nelson (Cushenbury buckwheat), *Astragalus albens* Greene (Cushenbury milk-vetch), *Lesquerella kingii* Wats. ssp. *bernardina* (Munz) Munz (San Bernardino Mountains bladderpod), and *Oxytheca parishii* var. *goodmaniana* Erter (Cushenbury oxytheca) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* All five species proposed for listing are restricted primarily to carbonate and adjacent carbonate/granitic substrates occupied by pinyon-juniper woodland on the northern side of the San Bernardino Mountains. The imminent and primary threat facing these species is the ongoing destruction of the carbonate substrates on which they grow by activities associated with limestone mining, including direct removal of mined materials, disposal of overburden on adjacent unmined habitat, and road construction.

Additional threats to their habitat include off-highway vehicle use, urban development near the community of Big Bear, development of a ski run, and energy development projects.

The first burst of mining activity in the San Bernardino Mountains occurred in the 1860s with the discovery of gold in Holcomb Valley. Historically, gold was extracted both by underground mining and by placer mining. Only small-scale and weekend prospecting for gold continues today. However, gold-bearing alluvium in Holcomb Valley has a low to medium potential for development in the future, and a good potential exists for a large gold extraction operation in the Blackhawk area (Forest Service 1988). Several silver mines were also in operation during the late 1800s in Cushenbury Canyon and near Blackhawk Mountain.

Limestone is considered a locatable mineral, as are gold and silver, and, therefore, is open to claim under the 1872 mining law. Virtually all of the approximately 13,210 hectares (32,620 acres) of carbonate substrates within the San Bernardino Mountains are currently under claim. Recent calculations by Brown (*in litt.*, 1992) break down the 13,210 hectares (32,620 acres) into component substrates as follows: 4,040 hectares (9,980 acres) of dolomite (30.6 percent), 7,910 hectares (19,530 acres) of limestone (59.9 percent); and 1,260 hectares (3,110 acres) mixed limestone and dolomite (9.5 percent).

Most of the currently mined limestone is being processed by four operations that are located along the base of the north slope of the mountains. Because of the limited availability of limestone in the western United States, those claims currently not under production are still being maintained either in anticipation of a future market, as a means of keeping claims from being mined by competing companies, or in anticipation of leasing out claims for the extraction of other valuable minerals.

In the surrounding Lucerne Valley mining district, the first limestone mines started operation in the 1940s; the current annual production of limestone is approximately 3.3 million tons (Forest Service 1988). Annual production, however, typically represents only the fraction of material that is trucked off the mine site as product. The ratio of disturbed material to product material may range from 1:1 up to more than 5:1. Forest Service records indicate that ratios at Riverside Cement (Partin) between 1972 and 1977 ranged from 4.9:1 to 13:1, and averaged 7.1:1. A 1988 calculation for the same operator placed the ratio at 6.7:1 (Forest Service 1988). Thus, based on the 1988

production of 3.3 million tons of limestone and a 5:1 ratio of disturbed material to limestone, 16.5 million tons of waste material would be generated. A typical mine site consists of an open pit or terraced pit, haul roads for hauling the blasted rock to a processing plant, and the processing plant itself, which sorts and crushes the material. The overburden is redistributed in piles on site. In the future, less low-grade limestone will be left onsite as the market for limestone products changes. The direct impacts to four of the five plants from limestone mining include the removal and destruction of individuals and habitat from mining, the construction of haul roads, and the deposition of overburden piles on top of currently occupied habitat. Certain operations targeting pharmaceutical grade limestone tend to create a higher ratio of exploratory roads and access roads relative to the size of the quarry operations since those deposits are smaller.

Aside from impacts associated with gold and limestone mining, several species are potentially threatened by destruction of habitat by other activities. Sand and gravel is currently being mined, and a new operation has been proposed for several washes on the lower desert-facing slopes that may impact at least one occurrence of *Erigeron parishii* (TMC 1989). Urban development has encroached upon several occurrences of *Lesquerella kingii* ssp. *bernardina* near Big Bear City and threatens to encroach upon an occurrence of *Erigeron parishii* near Pioneertown. The proposed addition of a downhill ski run to the ski area on the north side of Sugarlump Ridge may eliminate portions of an occurrence of *Lesquerella kingii* ssp. *bernardina*.

Other impacts include the destruction of individuals and habitat through increased off-highway vehicle and other recreational use that departs from roads built for mining assessment work as well as abandoned mine roads. The Forest Service has proposed construction of two new sections of the integrated off-highway vehicle system; these will potentially impact populations of all taxa except *Lesquerella kingii* ssp. *bernardina*.

Since publication of the proposal to list the five taxa, initial proposals for two energy developments have been received by the Forest Service. A proposed hydroelectric generation plant, which includes the use of an old mine quarry to hold water and new ground disturbance for construction of water delivery pipelines, would likely negatively affect populations of all five taxa except *Lesquerella kingii* ssp.

bernardina. A 115-kilovolt powerline proposed for construction through Cushenbury Canyon may affect *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, *Astragalus albens*, and *Oxytheca parishii* var. *goodmaniana*.

Because the location of the five plants is tied primarily to the location of carbonate deposits, it is useful to discuss threats relative to the primary plant population centers. A description of the primary population centers of the five plants and the threats in each area follows.

The westernmost occurrences of two of the plants under discussion (*Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum*) are in the vicinity of White Mountain, an outcrop that rises to 2,100 meters (6,900 ft) in elevation above the desert community of Lucerne Valley. The third largest of the limestone mines is located here, with an annual production of approximately 500,000 tons. The proximity of occurrences of *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum* to current mining operations indicates that these plants occurred on the mining site, but have been extirpated from it. The westernmost populations of these two species will soon be eliminated under a recently approved mining plan of operations. As compensation for this impact, the County of San Bernardino has directed the mining company to sponsor horticultural studies and experimental reseeding on reclaimed portions of the mine site.

Approximately 7.5 km (6 miles) to the east of White Mountain, the north side of Holcomb Valley drops off abruptly into Furnace Canyon. Habitat for *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum* was removed by quarry operations, including the construction of haul roads and the dumping of overburden at these quarry sites, which were primarily abandoned prior to 1974. In the areas adjacent to the quarry sites, populations of *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens*, portions of which have been eliminated, are still found. A proposed hydroelectric generation plant would use one of the abandoned quarries. If the proposed hydroelectric plant is approved, new disturbance associated with the project would likely disturb habitat for *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, *Astragalus albens*, and *Oxytheca parishii* var. *goodmaniana*.

The second largest operating limestone mine, with an annual production of 800,000 tons, is operating in the vicinity of Marble Canyon, a few miles east of Furnace Canyon. A recent expansion of one overburden pile is

eliminating a sizable population of *Astragalus albens*.

Six kilometers (4 miles) to the east of Furnace Creek is the deeply incised Cushenbury Canyon. The mining operation located at this site has an annual production of 2,000,000 tons of limestone, the largest of the four currently operating limestone mines. *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens* are found on the rocky slopes surrounding Cushenbury Canyon. A number of populations have already been negatively affected by mining and road construction. Up until several years ago, dust from the crushing operation was settling on the slopes downwind from the operation. The resultant and still present crust that formed on the slopes is thought to have inhibited the growth and survival of a number of plant species, including populations of *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens*. A population of *Oxytheca parishii* var. *goodmaniana*, one of the most restricted of the five taxa under discussion, was also rediscovered in this area in 1978. The species was not searched for in a 1990 survey at this location due to continuing drought conditions. A few populations of *Erigeron parishii* are found on alluvial substrates below the mouth of Cushenbury Canyon. A recent proposal to mine these alluvia for sand and gravel would threaten these populations.

Erigeron parishii, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens* occur 3.2 km (2 miles) to the east of Cushenbury Canyon on Blackhawk Mountain, which rises to an elevation of 2,000 meters (6,700 ft). Historically, gold and silver were mined near Blackhawk Mountain. New gold mining activity using cyanide heap-leach methods has been proposed for the north slope of Blackhawk Mountain, although to date only exploratory drilling has been done. Blackhawk Mountain currently supports one of the best assemblages of the carbonate endemic species. Old roads bisect the habitat, but the lack of limestone mining has left much of the landscape intact. Creek drainage, another dozen occurrences of these three species are scattered along Nelson Ridge and an unnamed ridge that flank Long Valley for a distance of approximately 6.4 km (4 miles). No active mining is currently found along the Helendale Fault, though historic mining may have affected certain occurrences, and some assessment work is currently being done.

Above Lone Valley, the main fork of Arrastre Creek slowly climbs for another

6.4 km (4 miles) towards the Rose Mine Valley-Tip Top Mountain area. Scattered occurrences of *Eriogonum ovalifolium* var. *vineum* are found along this stretch. Some of the densest stands of *Eriogonum ovalifolium* var. *vineum* have been bisected by motorcycle and jeep trails near Rose Mine Valley (Krantz 1979b); such use of the area continues.

Farther south and east, the tributaries of Arrastre Creek run off the north and west slopes of Tip Top Mountain, which rises to an elevation of 2,000 meters (6,700 ft). On the south and east side of Tip Top Mountain, tributaries flow into the Rattlesnake Canyon drainage. Along this drainage is another cluster of occurrences of *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum*. Significant new populations of *Oxytheca parishii* var. *goodmaniana* were located by Forest Service surveys in 1992 near Tip Top Mountain and nearby Mineral Mountain. The easternmost occurrences for *Oxytheca parishii* var. *goodmaniana* and *Eriogonum ovalifolium* var. *vineum* occur a few miles east of Tip Top Mountain. Historic mining has affected *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum*; Krantz (1979b) noted that a dirt road leading to an abandoned quarry had bisected habitat for both plants. *Erigeron parishii* may be able to tolerate some disturbance, as evidenced by its occurrence along roadsides, while *Eriogonum ovalifolium* var. *vineum* remains absent from roadsides in this area (Krantz 1979a, 1979b). Off-road vehicle traffic currently adversely impacts plants in this area.

About 24 km (15 miles) south and east of Tip Top Mountain, the mountains give way to the broad alluvial fans of the upper desert. Near Burns Reserve and Pioneertown, a few disjunct occurrences of *Erigeron parishii* are found. The Burns Reserve is protected by the State of California through the auspices of the Natural Reserve System of the University of California. The Pioneertown site has been proposed for urban development. The Nature Conservancy has secured a voluntary agreement with the landowner to protect the *Erigeron parishii* at this site.

Scattered patches of carbonate substrate occur outside the main belt that traverses the San Bernardino Mountains. On the east end of Bertha Ridge, north of Bear Valley, several small patches of *Lesquerella kingii* ssp. *bernardina* and *Eriogonum ovalifolium* var. *vineum* occur. These populations are adjacent to the community of Big Bear and are subject to impacts associated with urban development. Surveys by Myers and Barrows (1988)

indicated that several occurrences of *Lesquerella kingii* ssp. *bernardina* have been reduced in size since the previous surveys were performed in 1980 (Wilson and Bennett 1980).

At the northern edge of Holcomb Valley, *Oxytheca parishii* var. *goodmaniana* is found near an old gold mine site. A low to moderate potential exists for the reactivation of mining activity in this area in the future, depending on the price of gold (Forest Service 1988).

On the north-facing slope of Sugarlump Ridge on the south side of Bear Valley, several large populations of *Lesquerella kingii* ssp. *bernardina* were recently discovered. Several of these populations may be affected by the proposed expansion of a downhill ski area (Michael Brandman & Associates 1990).

In summary, virtually all of the carbonate substrates where these five species occur are under claim and subject to being mined or are threatened by other disturbance. The only sizable carbonate substrates not under claim are located on the south side of Bear Valley near Sugarlump Ridge. Those claims that are not currently being mined are being maintained either in anticipation of expanding operations once current quarry supplies are depleted (as a means of keeping competing companies from mining the claims) or in anticipation of leasing the claims for the mining of other valuable minerals.

All five taxa, except *Erigeron parishii*, are limited mainly in distribution to carbonate substrates within a 40-km (25-mile) range along the primarily northern slopes of the San Bernardino Mountains. The range of the five taxa overlap for the most part, but *Erigeron parishii* extends to the southeast another 16 km (10 miles). Although *Erigeron parishii* is found primarily on carbonate substrates, several occurrences are on non-carbonate substrates. The five species occur on lands under mining claim or on lands that have been patented, which subjects them to habitat destruction. Other activities, such as off-highway vehicle recreation, urbanization, development of a ski run, and energy development projects, threaten to alter or destroy habitat for, as well as the limited number of occurrences of, these five species.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Although these species are not presently sought after by collectors, they are vulnerable to taking because of their limited distribution. Some plant taxa have become vulnerable to collecting by curiosity seekers as a result of increased publicity following

listing. The increased public attention could potentially increase their desirability, thereby increasing the threat of collection.

C. Disease or predation. No data exist to substantiate whether or not disease threatens any of the plants. The seed capsules of *Lesquerella kingii* ssp. *bernardina* were observed to have been broken open by unknown seed predators at one of the Big Bear occurrences (C. Rutherford, U.S. Fish and Wildlife Service, and M. Lardner, U.S. Forest Service, pers. obs., 1990). It is unknown whether seed predation would affect the viability of the species. In the vicinity of Round Mountain, several occurrences of *Astragalus albens* are known to occur within a grazing allotment administered by the Bureau of Land Management (BLM). The effects of cattle grazing on this species have not yet been investigated.

D. The inadequacy of existing regulatory mechanisms. All five plants are on List 1B of the California Native Plant Society, indicating that, in accordance with chapter 10, sec. 1901 of the California Department of Fish and Game Code, they are eligible for State listing. If State listing were pursued, the Native Plant Protection Act and the California Endangered Species Act would prohibit the "take" of State-listed plants (Fish and Game Code chapter 10, sec. 1908, and chapter 1.5, sec. 2080), but would not protect the plants from taking via habitat modification or land use change by the landowner. After the California Department of Fish and Game notifies a landowner that a State-listed plant grows on his or her property, State law requires only that the landowner notify the agency "at least 10 days in advance of changing the land use to allow salvage of such plant" (chapter 10, sec. 1913). Although these State laws provide a measure of protection to the species, they are not adequate to protect the species in all cases. Numerous activities do not fall under the purview of this legislation, such as certain projects proposed by the Federal government and projects falling under State statutory exemptions. Where overriding social and economic considerations can be demonstrated, these laws allow project proposals to go forward, even in cases where the continued existence of the species may be jeopardized or where adverse impacts are not mitigated to the point of insignificance.

About 20 to 25 percent of the occurrences of *Erigeron parishii* and 15 to 20 percent of the occurrences of *Eriogonum ovalifolium* var. *vineum* occur on private land. The mining of limestone on private land is under the

jurisdiction of the county of San Bernardino, which is responsible for administering regulations in accordance with the California Environmental Quality Act and the California Endangered Species Act. The county has included terms and conditions in the granting of certain operating permits that have directed the applicants to undertake efforts to restore the habitat and reintroduce *Erigeron parishii* and *Eriogonum ovalifolium* var. *vineum* to the site. Recently, the county included a permit condition for the expansion of an overburden pile that required the applicant to designate preserve areas with the concurrence of the California Department of Fish and Game and the Service. One population of *Erigeron parishii* occurs on land owned by the University of California at the Burns Pinyon Reserve; no activities are currently planned that would affect the population. The remaining occurrences of these two species, as well as almost all the occurrences of the other three species are primarily on lands managed by the Forest Service and, to a lesser degree, by BLM.

Several laws enacted by Congress and regulations promulgated to implement them address surface management of Federal lands, including mining, but they provide limited protection for natural resources. For instance, the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1701 et seq.), as amended, was passed to provide policy for "the management, protection, development, and enhancement" of public lands managed by BLM. Section 302 of FLPMA, which addresses management of use, occupancy, and development of public lands, states "* * * the Secretary shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands" (43 U.S.C. 1732 (b)). Unnecessary or undue degradation is defined to mean surface disturbance greater than that which would normally result by a prudent operator taking into account the effects of mining operations on other resources (43 CFR 3809.0-5(k)). The policy of FLPMA as expressed by regulation is that a person has a statutory right to mine certain Federal lands (43 CFR 3809.0-6). Mining operations that exceed 5 acres in extent and certain other defined operations require a plan of operations that must be approved by BLM (43 CFR 3809.1-4, 1-6). However, prior to approval of the plan, BLM must evaluate the action with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat if any.

Federal agencies, such as BLM, are required to (1) confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat, or (2) enter into formal consultation with the Service on any action that is likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat. However, Federal agencies are not required to implement Service recommendations for proposed species or proposed critical habitat. Therefore, although FLPMA affords some general protection in that resources other than mining interests must be considered by an operator, the protections afforded listed species pursuant to section 7 of the Endangered Species Act are not required to be implemented unless listing takes place. Thus, listing affords additional protection to these particular species.

Additionally, section 601 of FLPMA specifically addresses management of public lands within the California Desert Conservation Area, which includes all BLM lands where four of the five plants occur (except *Lesquerella kingii* ssp. *bernardina*) (43 U.S.C. 1781). The purpose of this section is "to provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality" (43 U.S.C. 1781). Multiple use is defined, in part, to mean "the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people . . ." (43 U.S.C. 1702(c)). The concept of multiple use includes the "harmonious and coordinated management of the various resources without permanent impairment of the . . . quality of the environment with consideration being given to the relative values of the resources . . ." (Id.).

Section 1781 of FLPMA states that the use of these desert resources should be provided for in a multiple use and sustained yield management plan (43 U.S.C. 1781(a)(4)). These resources specifically include "certain rare and endangered species of wildlife, plants, and fishes . . . [which] are seriously threatened by inadequate Federal management authority, and pressures of increased use . . ." (43 U.S.C. 1781(a)(3)). As a result, the Secretary of the Department of the Interior is directed to prepare and implement a

long-term plan for the "management, use, development, and protection" of the lands within this Conservation Area (43 U.S.C. 1781(d)). This plan is to take into account multiple use and sustained yield, and provide for resource use and development, which is to include "maintenance of environmental quality, rights-of-way, and mineral development" (Id.). So even though FLPMA may contain language to protect the five plant species to a certain degree through the maintenance of environmental quality, FLPMA was written to provide for multiple use. Such use does not necessarily elevate the needs of these species over other public land uses. Indeed, regulations promulgated to implement certain provisions of FLPMA provide for the approval of mining if the appropriate Federal official has complied with the section 7 consultation provisions of the Endangered Species Act (43 CFR 3899.1-6(a)(5)). However, the protections afforded listed species pursuant to section 7 of the Endangered Species Act are not required to be implemented unless listing takes place. Therefore, listing affords another layer of protection to these species.

Similar regulations have been promulgated for National Forest System lands (36 CFR part 228) so that mining "shall be conducted so as to minimize adverse environmental impacts on National Forest System surface resources" (36 CFR 228.8). Although these regulations do not specifically require compliance with section 7 of the Endangered Species Act as a prerequisite to approval of a mining plan of operations, the Act requires Service consultation for any action the Federal action agency authorizes, funds, or carries out (16 U.S.C. 1536) that may affect a federally listed species. Therefore, Forest Service approval of a mining plan of operations would require section 7 compliance, which would afford additional protection to listed plant species.

The Forest Service has attempted to reduce impacts of mining within carbonate plant habitat. As early as 1977, the Forest Service recognized four of the plants (all but *Oxytheca parishii* var. *goodmaniana*) as "sensitive species;" *Oxytheca parishii* var. *goodmaniana* was added to its list of sensitive species in 1990. The Forest Service has worked with the mining companies to minimize impacts to the plants since at least 1987 (Forest Service, *in litt.*, 1992). In the Management Plan for the San Bernardino National Forest (Forest Service 1988), the Forest Service recommended conserving at least two-

thirds of the existing populations for three of the taxa (*Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens*) in perpetuity by establishing refugia for conserving selected occurrences of these five plants as part of a regional conservation plan. In addition, all of the habitat for *Lesquerella kingii* ssp. *bernardina* was recommended for protection. This would entail securing refugia sites either by withdrawal from mineral entry or by transferring claim rights. To date, the Forest Service has hosted several interagency meetings to develop strategies to implement this forest management plan direction by identifying criteria for refuge design and strategies for establishing a minerals withdrawal. A draft habitat management guide for the carbonate plants is expected to be released within several years. However, approval and implementation of recommended actions may not take place for several years subsequent to release of the guide.

In response to the proposal, Brown (*in litt.*, 1992) has claimed that the actual amount of limestone to be mined in the foreseeable future (defined as 75 years) is only 2 percent of the existing surface expression of limestone deposits in the San Bernardino Mountains. The 1872 mining law states that claimholders must have an actual intent to mine. The Service, therefore, must assume that all claims are being held with the intent to mine. One industry representative cited two reasons why claimholders would not relinquish claims even if no future mining were intended. First, it would prohibit a competing company from mining the mineral resource. Secondly, the claims could be mined for strategic minerals other than limestone. The 1872 mining law does not include a mechanism for voluntary relinquishment of a claim or transfer of a claim to a third party for the purposes of resource conservation even if a claimholder wished to do so. Once it was proven that the third party had no intent to mine, the claim could legally be seized by other mining interests (Bill Tilden, Pfizer, Inc., pers. comm., 1992).

The surface management of public lands under U.S. mining laws (43 CFR part 3809) requires BLM to process applications to "patent" mining claims on all Federal lands. BLM has reported that since the proposal to list the carbonate plants was published, it has received an increase in patent applications submitted by industry claimholders with claims occurring within the range of the five carbonate plants (Mike Ford, geologist, formerly BLM, pers. comm., 1992). One industry representative has indicated that

changes in the 1872 mining law will require that the cost of the required annual assessment work per 8-hectare (20-acre) claim (\$100) be paid as a fee directly to BLM, rather than performed as on-the-ground assessment work. This may provide additional incentive to claimholders to patent claims to avoid the increase in out-of-pocket costs for the annual assessment work. An increase in the number of claims being patented could remove these lands from continued Federal jurisdiction. The elimination of Federal jurisdiction becomes important regarding protection of plants because of the reduced protection afforded by the Endangered Species Act for plants on private lands.

E. Other natural or manmade factors affecting its continued existence. Populations consisting of a small number of individuals always face the possibility of stochastic extinction (i.e., extinction due to random events, including fire, flood, drought, landslide, disease, or predation). The total amount of annual precipitation, as well as the timing of such precipitation, may be crucial for seedling germination and subsequent establishment. A significant drop in the size of *Lesquerella kingii* ssp. *bernardina* populations in the Bertha Ridge area between 1980 and 1988 (from 25,000 to 15,000 individuals) may be in part due to several years of drought conditions. Conversely, the high amount of precipitation received during March 1992 may, in part, account for the increased number of *Astragalus albens* individuals observed during 1992 surveys compared to the number found in previous surveys. Such fluctuations in population sizes should be expected, but at the same time emphasize the need to maintain *in situ* seedbanks on suitable habitat. Moreover, drought-stressed plants can become vulnerable to additional damage from pathogens or insects. The risk of stochastic extinction for *A. albens* and *Oxytheca parishii* var. *goodmaniana*, which currently consist of fewer than 10,000 individuals each, is considered high.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these five species in determining to issue this final rule. Based on this evaluation, the preferred action is to list *Eriogonum ovalifolium* var. *vineum*, *Astragalus albens*, *Lesquerella kingii* ssp. *bernardina*, and *Oxytheca parishii* var. *goodmaniana* as endangered. Destruction of their habitat by activities associated with limestone mining, sand and gravel mining, off-road vehicle and other recreational use, and energy

development projects, as well as their vulnerability to stochastic events, exposes these four plant species to the danger of extinction throughout all or a significant portion of their ranges. These species thus fit the Act's definition of endangered. While *Erigeron parishii* faces the same threats as the other four species, it has the widest range of distribution; at least a few populations within the range of the species occur at locations with non-carbonate substrates, which are not currently under mining claim. Therefore, the preferred action is to list *Erigeron parishii* as threatened.

Critical Habitat

Section 4(a)(3) of the Act requires that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat for *Eriogonum ovalifolium* var. *vineum*, *Astragalus albens*, *Lesquerella kingii* ssp. *bernardina*, *Oxytheca parishii* var. *goodmaniana*, and *Erigeron parishii* is not presently prudent. The publication of critical habitat descriptions and maps required for critical habitat designation would increase the degree of threat to these plants from possible take or vandalism, and could contribute to their decline. The listing of species as either endangered or threatened publicizes the rarity of the plants and can make these plants attractive to researchers, curiosity seekers, or collectors of rare plants. All appropriate Federal agencies and local planning agencies have been notified of the location of these species and importance of protecting their habitat. Protection of these species' habitat will be addressed through the recovery process and potentially through the section 7 consultation process. Therefore, the Service finds that designation of critical habitat for these plants is not prudent at this time; such designation likely would increase the degree of threat from vandalism, collecting, or other human activities.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions

be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Populations of all five plant species occur in large part on Federal land. *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, and *Astragalus albens* occur on land managed by the San Bernardino National Forest and the California Desert District of BLM. *Lesquerella kingii* ssp. *bernardina* and *Oxytheca parishii* var. *goodmaniana* occur primarily on land managed by the San Bernardino National Forest. Federal activities potentially impacting one or more of the five plants and likely to trigger formal consultation under section 7 of the Act include the approval of mining plans of operations; approval of mining reclamation plans; construction of recreational facilities, such as off-highway vehicle trails and the ski run; rights-of-way for various activities including access to mining claims and energy development corridors; and grazing allotments. The patenting of mining claims are processed by BLM; however, legal opinions differ as to whether this process can be considered a Federal activity subject to section 7 of the Endangered Species Act. The Army Corps of Engineers (Corps) will have permitting authority as described under section 404 of the Clean Water Act for construction of a hydroelectric power plant and a sand and gravel mining operation being proposed for the Cushenbury Springs area. By regulation, nationwide or individual permits cannot be issued where a federally listed endangered or threatened species would be affected by a proposed project without first completing formal consultation pursuant to section 7 of the Endangered Species Act. In addition, construction of the hydroelectric power

plant most likely will require the approval of the Federal Energy Regulatory Commission and thus require formal consultation.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 for endangered plants and 17.71 and 17.72 for threatened plants set forth a series of general prohibitions and exceptions that apply to all listed plants. With respect to the five carbonate endemics from southern California, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61 and 17.71, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export; transport in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale in interstate or foreign commerce; or to remove and reduce to possession any such species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any area under Federal jurisdiction, or remove, cut, dig up, damage or destroy listed plants on any other area in knowing violation of any State law or regulation, or in the course of any violation of a State criminal trespass law. Seeds from cultivated specimens of threatened plant species are exempt from these prohibitions provided that a statement of "cultivated origin" appears on their containers. Certain exceptions apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62, 17.63, and 17.72 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered and threatened plant species under certain circumstances.

It is anticipated that few trade permits would ever be sought or issued because the five plant species are not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, 911 N.E. 11th Avenue, Portland, Oregon 97232-4181 (telephone 503/231-6241, facsimile 503/231-6243).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, or Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination

was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein, as well as others, is available upon request from the Ventura Field Office (see ADDRESSES section).

Author

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.12(h) by adding the following, in alphabetical order under the plant families indicated, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.
 * * * * *
 (h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Asteraceae—Aster family:						
<i>Erigeron parishii</i>	Parish's daisy	U.S.A. (CA)	T	548	NA	NA
Brassicaceae—Mustard family:						
<i>Lesquerella kingii</i> ssp. <i>bernardina</i> .	San Bernardino Mountains bladderpod.	U.S.A. (CA)	E	548	NA	NA
Fabaceae—Pea family:						
<i>Astragalus aibens</i>	Cushenbury milk-vetch	U.S.A. (CA)	E	548	NA	NA
Polygonaceae—Buckwheat family:						
<i>Eriogonum ovalifolium</i> var. <i>vineum</i> .	Cushenbury buckwheat	U.S.A. (CA)	E	548	NA	NA
<i>Oxytheca parishii</i> var. <i>goodmaniana</i> .	Cushenbury oxytheca	U.S.A. (CA)	E	548	NA	NA

Dated: August 3, 1994.
 Mollie H. Beattie,
 Director, U.S. Fish and Wildlife Service.
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