Dated: July 16, 1993.

Richard N. Smith,

Acting Director, U.S. Fish and Wildlife Service.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018—AB73

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Fish and Wildlife Service (Service) determines three plants (*Pogogyne nudiuscula* (Otay Mesa mint), *Orcuttia californica* (California Orcutt grass), and *Eryngium aristulatum* var. *parishii* (San Diego button-celery)) and the Riverside fairy shrimp (*Streptocephalus woottoni*) to be endangered species throughout their respective ranges. These species collectively occur in vernal pools from southwestern Riverside County and western San Diego County, California, to northwestern Baja California, Mexico. One population of *Orcuttia californica* is known from Ventura County. One population of Riverside fairy shrimp is known from Orange County. Habitat loss and degradation due to urban and agricultural development, livestock grazing, off-road vehicle use, trampling, invasion from weedy non-native plants, and other factors threaten the continued existence of these species. This rule implements the protective provisions of the Endangered Species Act (Act) of 1973, as amended, for these four taxa.

EFFECTIVE DATE: August 3, 1993.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Carlsbad Field Office, 2730 Loker Avenue West, Carlsbad, California, 92008.

FOR FURTHER INFORMATION CONTACT: Nancy Gilbert or Ellen Berryman at the above address (619/431–9440).

SUPPLEMENTARY INFORMATION:

Background

The three plants and the fairy shrimp occur in vernal pools, a habitat that forms in areas with Mediterranean climates where slight depressions become seasonally wet or inundated following fall and winter rains. Water remains in these pools for a few months at a time, due to an impervious layer such as hard pan, clay, or basalt beneath the soil surface. Gradual drying occurs during the spring (Holland 1976). The pools form on mesa tops or valley floors and are interspersed among very low hills usually referred to as mima mounds (Zedler 1987).

Pogogyne nudiuscula is a member of the mint family (Lamiaceae), typically blooming from May through June (Munz 1974). This aromatic plant was originally described by Gray (1876), as cited by Howell (1931). *P. nudiuscula* Gray is an erect annual reaching 12 inches (in) (3 decimeters (dm)) in height. The bright green, spatulate leaves have few hairs. Bright purple flowers occur in whorls on spikes. The lack of hairs on the calyx and bracts of this plant differentiate the species from *Pogogyne abramsii*. A large population, originally identified as *P. nudiuscula*, was recently found in Valle de las Palmas, in Baja California, Mexico, 17 miles (28 kilometers (km)) south of the international border (Howard Weir, Dudek and Associates, pers. comm., 1992). However, enough evidence was gathered to describe the Mexican population as a distinct species, and a description of this taxon was expected to be published in the spring of 1993 (Scott McMillan, Department of Biology, San Diego State University, *in litt.*, 1992).

Orcuttia californica Vasey is a member of the grass family (Poaceae). It is associated with deeper pools of water than is *Pogogyne nudiuscula* and *Eryngium aristulatum* var. *parishii*. *O. californica* was first collected by Orcutt and was described by Vasey (1886). Subsequently, this plant was considered the nominate variety of *O. californica*, and several other varieties were also recognized. Reeder (1982) raised the varieties of *O. californica* to species status. This small annual grass reaches 4 in (1 dm) in height, is bright green, and secretes sticky droplets that taste bitter. Inflorescences, borne from May through June, consist of seven spikelets arranged in two ranks, with the upper spikelets overlapping on a somewhat twisted axis. *O. californica* is differentiated from other species in the genus by the following characteristics: teeth of lemma (bract enclosing the floret) 0.2 in (5 millimeters (mm)) long or less, the teeth sharp-pointed or with awns (terminal bristles) 0.2 in (0.5 mm) long or less; culms (stems) usually prostrate, caryopsis (fruit) 0.06–0.07 in (1.5–1.8 mm) long; plants sparingly pilose (bearing soft and straight spreading hairs); and spikelets remote on the axis below, crowded toward the apex.

Eryngium aristulatum Jepson var. *parishii* (Coulter and Rose, 1990) Mathias and Constance (San Diego button-celery) is a member of the parsley family (Apiaceae). It is associated with white clay bottom pools devoid of hard pans. This plant was originally described as *E. parishii* by Coulter and Rose (1900). The plant was reclassified by Jepson (1923) as *E. jepsonii* var. *parishii*. Jepson (1936) returned to the Coulter and Rose (1900) classification. Mathias and Constance (1941) separated *E. aristulatum* from *E. jepsoni* due to morphological characteristics and treated this plant as a variety of *E. aristulatum* (var. *parishii*). *E. aristulatum* var. *parishii* blooms from May through June (Constance 1977). This plant is usually an annual; however, under favorable conditions it facultatively becomes a perennial herb with a perennial tap root. The plant has spreading or ascending shape and reaches a height of 16 in (4 dm). The stems and lanceolate leaves are gray green with spinose lobes giving the plant a prickly appearance. Inflorescences form on short stalks with few-flowered greenish heads at the ends of branches. Its greenish heads, fruits with unequal scales, and bractlets without calloused margins separate *E. aristulatum* var. *parishii* from other varieties.

The Riverside fairy shrimp (*Streptocephalus woottoni*) is a small freshwater crustacean of the Order Anostraca, Family Streptocephalidae. The species was first collected in 1979 by Dr. Clyde Erickson and was identified as a new species in 1985 (Eng *et al.* 1990). The discoverers of this taxon described this animal in the Journal of Crustacean Biology as a new species, and named it *Streptocephalus woottoni* (Eng *et al.* 1990). The species most similar to *S. woottoni* is *S. seali*, discovered by Ryder in 1879. Plumose setae edge the cercopods of mature male *S. woottoni*, whereas spines replace the setae on the distal half of the cercopods in mature *S. seali*. The last abdominal segment is short in both species; however, *S. woottoni* lacks the confluent inner margins of the cercopods characteristic for male *S. seali* and *S. similis*, which was discovered by Baird in 1852. Both males and females of *S. woottoni* have the red color of the cercopods covering all of the ninth and 30 to 40 percent of the eighth abdominal segments; no red extends onto the

abdominal segments of either sex in *S. seali*.

Mature males are between 0.56 in (14 mm) and 0.92 in (23 mm) in length. The frontal appendage is cylindrical, bilobed at the tip, and extends only part way to the distal end of the basal segment of the antenna. The spur of the thumb is a simple bladelike process. The finger has two teeth; the proximal tooth is shorter than the distal tooth. The distal tooth has a lateral shoulder that is equal to about half the tooth's total length measured along the proximal edge. The cercopods are separate with plumose setae along the medial and lateral borders. Mature females are between 0.56 in (14 mm) and 0.84 in (21 mm) in total length. The brood pouch extends to abdominal segments 7, 8, or 9. The cercopods are as in the male.

The conditions that create suitable habitat for these four species are seasonal (vernal) pools of shallow freshwater, which were probably never common. However, agricultural and, more recently, urban development have eliminated the majority of suitable habitat.

A number of studies were conducted on vernal pools in San Diego County. For mapping and description purposes, a standardized system was developed for the designation of these vernal pools (Beauchamp 1979). A series letter is used to denote vernal pools in a general region, and numbers are used to designate several pool groups within the series. Examples include: *Pogogyne nudiuscula* and *Orcuttia californica* are both found in the pools of the "J" series on Otay Mesa (these two species are not known to occur in the same pool), *Eryngium aristulatum* var. *parishii* occurs in several pool series, and the Riverside fairy shrimp is known to occur within two pool series (J and U) in San Diego (the "U" series occurs on the Miramar Naval Air Station).

Historically, *Pogogyne nudiuscula* was known to exist from Otay Mesa of San Diego County (Bauder 1986) to immediately south of the international border in Baja California, Mexico (Moran 1981). The historic range of this species may have extended to the mesas east of Balboa Park and south of Mission Valley in San Diego where vernal pools contain *P. abramsii*, another endangered vernal pool plant (Bauder 1986). The sites in extreme northern Baja California, Mexico, were very likely extirpated (Moran 1981). The current known distribution of *P. nudiuscula* is restricted to some of the remaining vernal pools on Otay Mesa.

Orcuttia californica once occurred in vernal pools from San Quintin, Baja California, Mexico (Moran 1981), northward to Riverside, Los Angeles, and San Diego Counties in southern California. Historically known populations from near Downey and Lakewood in Los Angeles County and near Murietta Hot Springs in Riverside County were extirpated. This species prefers deeper water than *Pogogyne nudiuscula* or *Eryngium aristulatum* var. *parishii*. *O. californica* still occurs in vernal pools on The Nature Conservancy's Santa Rosa Plateau Preserve, in a vernal pool within Salt Creek drainage near Hemet (Dave Bramlet, botanist, *in litt.*, 1992), and in the Skunk Hollow pool in Riverside County (Lathrop 1976). In San Diego County, this species is present in pools on Otay Mesa (Bauder 1986). One population of *O. californica* is present in a vernal pool in Woodland Hills of Ventura County. The current population status of *O. californica* in Baja California, Mexico, is unknown. Agricultural development is widespread and increasing in areas where vernal pool habitat is typically found (Moran 1981).

Eryngium aristulatum var. *parishii* once occurred from Riverside County, California, south to northern Baja California, Mexico (Constance 1977). This species currently occurs on the Santa Rosa Plateau in Riverside County; on Otay Mesa, Kearny Mesa, Del Mar Mesa, Miramar Naval Station, and Camp Pendleton in San Diego County; and in northern Baja California, Mexico. A number of sites were eliminated in recent years. Although this species remains comparatively widespread within and adjacent to remaining vernal pools, vernal pool habitat has greatly declined, and most of the remaining pools face one or more threats. Additionally, the distribution of *E. aristulatum* var. *parishii* is patchy, which makes it more vulnerable to local extinction than more evenly distributed species (Bauder 1986).

The Riverside fairy shrimp is known from four vernal pools in a 37 square mile (91 square km) area near Temecula in southwestern Riverside County (Eng *et al.* 1990), and from one population in Orange County. In San Diego County in the fall of 1989, this species was discovered within vernal pools on Miramar Naval Air Station and Otay Mesa (Marie Simovich, University of San Diego, *in litt.*, 1989). However, since the 1989 discovery of the species in San Diego County, numerous vernal pool complexes in the county have been surveyed by Simovitch, but no additional populations of Riverside fairy shrimp have been found. This species was also found at two locations in Baja California, Mexico: Valle de las Palmas, 28 kilometers south of the Mexican border; and approximately 37 kilometers south of El Rosario (H. Weir, and J. Brown, Dudek and Associates, pers. comm., 1992). Urban and agricultural development currently threaten all four remaining pools supporting the fairy shrimp in Riverside County. The distribution of these three plant and one crustacean vernal pool species among pool group sites is summarized in the following table.

DISTRIBUTION OF SPECIES AMONG POOL GROUP SITES

Pool group sites	*Pogogyne nudiuscula*	*Orcuttia californica*	*Eryngium aristulatum* var. *parishii*	Riverside fairy shrimp
San Diego County:				
Otay Mesa	x	x	x	x
Kearny Mesa			x	
Miramar Naval Station			x	x
Camp Pendleton			x	
San Marcos			x	
Penasquitos			x	

DISTRIBUTION OF SPECIES AMONG POOL GROUP SITES—Continued

Pool group sites	*Pogogyne nudiuscula*	*Orcuttia californica*	*Eryngium aristulatum* var. *parishii*	Riverside fairy shrimp
Riverside County:				
Santa Rosa Plateau		x	x	
Skunk Hollow		x		x
Salt Creek		x		
Pechanga Indian Res				x
Murrieta Golf Course				x
Ventura County		x		
Orange County				x
Baja California, Mexico	x			x

Previous Federal Action

Federal action on two of the plant species began when the Secretary of the Smithsonian Institution, as directed by section 12 of the Endangered Species Act (Act) of 1973, prepared a report on those native plants considered to be endangered, threatened, or extinct in the United States. This report (House Document No. 94–51) was presented to Congress on January 9, 1975, and included *Pogogyne nudiuscula* and *Orcuttia californica*, but not *Eryngium aristulatum* var. *parishii*. On July 1, 1975, the Service published a notice accepting the report as a petition under section 4(c)(2) (now section 4(b)(3)(A)) of the Act (40 FR 27823), and gave notice of the status review of *P. nudiuscula* and *O. californica*. On June 16, 1976, the Service published a proposed rule in the **Federal Register** (41 FR 24523) to determine approximately 1,700 vascular plant species, including *O. californica* and *E. aristulatum* var. *parishii*, but not *P. nudiuscula*, to be endangered species pursuant to section 4 of the Act. This list was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94–51 and the July 1, 1975, **Federal Register** publication. A summary of general comments received by the Service on the 1976 proposal was published in the **Federal Register** on April 26, 1978 (43 FR 17909).

In 1978, the amendments to the Act required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals already more than 2 years old. On December 10, 1979, the Service published a notice in the **Federal Register** withdrawing the portion of the June 16, 1976, proposal that was not made final, including *Orcuttia californica* and *Eryngium aristulatum* var. *parishii*.

The Service published an updated notice of review for plants on December 15, 1980 (45 FR 82480). This notice included *Eryngium aristulatum* var. *parishii*, *Orcuttia californica*, and *Pogogyne nudiuscula* as category 1 candidates (species for which the Service has sufficient data in its possession to support a Federal listing proposal as endangered or threatened). On February 15, 1983, the Service published a notice (48 FR 6752) of its prior finding that the listing of these species may be warranted in accordance with section 4(b)(3)(A) of the Act. On October 13, 1983, the Service found that listing of these plant species was warranted but precluded in accordance with section 4(b)(3)(iii) of the Act. Notification of this finding was published on January 20, 1984 (49 FR 2485). Such a finding requires the petition to be recycled pursuant to section 4(b)(3)(C)(i) of the Act. The finding was reviewed in October of 1984, 1985, 1986, 1987, 1988, 1989, 1990, and 1991.

Because it was not identified until 1985, and its existence remained known only to a few scientists until 1988, the proposed rule represented the first Federal action on the Riverside fairy shrimp. The proposed rule to list the three vernal pool plants and the Riverside fairy shrimp as endangered was published in the **Federal Register** on November 12, 1991 (56 FR 57503). A notice that the proposed rule was published in the **Federal Register**, was printed on October 14, 1992 in the Riverside "Press Enterprise" and the "San Diego Union Tribune".

Summary of Comments and Recommendations

The proposed rule and associated notifications solicited all interested parties to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Four letters were received in support of listing the Riverside fairy shrimp, and two of these letters contributed additional information that is incorporated into the **Summary of Factors Affecting the Species** section presented below. One of the four letters, from the California Department of Fish and Game, also supported listing of the three proposed plants. No other comments were received regarding the Service's position, the proposed action, or data on the proposed species.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Orcuttia californica* Vasey (California Orcutt grass), *Pogogyne nudiuscula* Gray (Otay mesa mint), *Eryngium aristulatum* var. *parishii* (Coulter and Rose, 1990) Mathias and Constance (San Diego button-celery), and the Riverside fairy shrimp (*Streptocephalus woottoni*) should be classified as endangered species. Procedures found at section 4 of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Orcuttia californica*, *Pogogyne nudiuscula*, *Eryngium aristulatum* var. *parishii*, and the Riverside fairy shrimp are as follows:

A. The Present or Threatened Destruction, Modification or Curtailment of Its Habitat or Range

The habitat and range of these four species has been greatly reduced. Vernal pools, existing as slight depressions on flat mesas, are found in locations that are especially vulnerable to one or more of the following habitat disturbances: Urban and agricultural development, off-road vehicle use, cattle trampling, human trampling, road development, military activities, and water management activities. Many pool groups were entirely eliminated and replaced with urban or agricultural developments.

Vernal pool habitat in San Diego County has declined by 97 percent (T. Oberbauer, Department of Planning and Land Use, San Diego County, pers. comm., 1990), and most of the remaining pools face one or more threats. Similar declines in habitat have occurred in Riverside and Ventura Counties, and to a lesser degree in Baja California, Mexico. Vernal pool habitat in Los Angeles County has been destroyed. In Orange County, 90 to 98 percent of the historical vernal pool habitat has been eliminated (F. Roberts, Service, pers. comm., 1993). Vernal pool flora in Orange County has not been well documented. Most of the remaining vernal pools face one or more threats in the rapidly growing southern California area.

The vernal pool habitat upon which these four species depend is also vulnerable to destruction due to alteration of the watershed. In some cases, an increase in pool water volume due to urban run-off has led to more prolonged periods of inundation, and at the other extreme, some pools have been drained or blocked from their source of water. *Orcuttia californica* usually occurs in the deepest portion of vernal pools and occurs in some pools with marshy elements. Hence, it is more likely to be adversely affected by the latter type of drainage alterations.

Pools have also been degraded due to the use of off-road vehicles, which have impacted the habitats of all four species. These vehicles compact soils, crush plants when water is in the pools, cause turbidity, and leave deep ruts. The damage may alter the microhydrology of the pools. Dirt roads that go through or adjacent to pools are widened as motorists try to avoid the inevitable mud puddles. Thus, pools are gradually destroyed by vehicles traveling on dirt roads. Vehicle access and damage has occurred on virtually all remaining vernal pool complexes.

Otay Mesa, where all four species occur, has the most threats of habitat damage of all the sites. The Service is aware of 37 separate proposed precise development plans and tentative maps that have been filed for Otay Mesa, as required by the California Environmental Quality Act. These plans encompass approximately 80 percent of the undeveloped portion of the mesa within the jurisdiction of the City of San Diego and virtually all but four of the remaining vernal pool complexes. Of the four remaining pool complexes, three are adversely affected by other activities or development proposals.

Preliminary designs by the California Department of Transportation for State Route 125 include alignments that sever the existing natural connection between two of the largest remaining vernal pool complexes on Otay Mesa. The construction of this new major highway access route into Otay Mesa would further facilitate its development.

The existing Brown Field Airport is presently being evaluated as a potential site for an international airport servicing San Diego. This proposal includes alternative runway alignments that would destroy portions of one of the two largest remaining vernal pool complexes. A binational airport is also being considered for Otay Mesa, although these plans are too preliminary to allow assessment of potential impacts to vernal pools. An increase in the number of vehicle trips in this area would occur as a result of the airport, and this increased traffic would likely lead to a demand for more roads, which could directly impact the pools.

Habitat trampling, and in some cases trampling of the organisms, due to livestock grazing occurs on Otay Mesa in areas where several vernal pool complexes collectively contain all four of the proposed species. Organisms within the pools may be trampled and killed by livestock prior to reproduction. Soil may become compacted or eroded, and water may be impacted with sediment. *Eryngium aristulatum* var. *parishii* is sometimes able to withstand light trampling because of the buffering effect of its perennial tap root.

Otay Mesa is a common area for travel from Mexico to the United States; hence, habitat and plants are threatened with trampling by humans. Also, the Immigration and Naturalization Service has proposed several projects at the international border, including border lighting, that could result in direct adverse impacts to vernal pools on Otay Mesa, due to construction activities.

In 1979, *Pogogyne nudiuscula* was limited to 10 pool groups on Otay Mesa containing some 170 individual vernal pools. By 1986, this species was extirpated from all but 3 pool groups encompassing about 38 pools. In two groups, the plant was limited to a single pool each and was noticeably declining in the third group. Vehicular activity was occurring in two of the remaining groups and partially explained one of the extirpations. Only one of the pool groups was described as having dense populations of *P. nudiuscula* (Bauder 1986). This site is on protected private land. In the 1990 survey of Otay Ranch, four *P. nudiuscula* populations were confirmed (California Department of Fish and Game 1991).

Pogogyne nudiuscula now only remains in four populations, all located on Otay Mesa. These pools are threatened by various activities; for example, one of the alternatives for a proposed development project would eliminate 80 of 97 of the remaining vernal pools on Otay Mesa containing *P. nudiuscula* (S. McMillan, *in litt.*, 1992). However, proposed mitigation measures for the project would preserve a minimum of 95 percent of the vernal pool habitat (no less than 330 acres south of the Otay River) within the project area. Although the developer's proposed vernal pool preservation plan would include soil stabilization, hydrologic functions could change, and adversely affect vernal pool plants. Final approval of the proposed project and mitigation measures are pending before the City of Chula Vista and County of San Diego (Otay Ranch Joint Planning Project 1992).

In 1979, *Orcuttia californica* occurred on Otay Mesa in 7 pool groups containing 34 vernal pools. By 1986, agricultural plowing had destroyed 11 of these vernal pools. *O. californica* on Otay Mesa presently occurs in only 2 vernal pool groups, which contain 10 vernal pools. All of the remaining 10 pools supporting *O. californica* on Otay Mesa are grazed by livestock; hence, the habitat and plants are impacted by trampling. Five pools were adversely affected by trampling associated with immigrants attempting to cross the Mexico—United States border (Bauder 1986).

Three vernal pool groups in southwestern Riverside County also contain *Orcuttia californica*. One of these complexes is partially preserved within The Nature Conservancy's Santa Rosa Plateau Reserve. Another complex is located within the 14-acre Skunk Hollow pool, the last remaining valley type vernal pool in Riverside County. This pool is often plowed and is within the general locale of a conditionally approved residential development. A

proposed project in the Skunk Hollow area includes major improvements to roads and utility crossings that would directly impact 0.2 acres of the Skunk Hollow watershed. Proposed mitigation consists of experimental watershed creation. Soil sedimentation could still occur as well as impacts to hydrologic function. Several tract projects, already approved within the watershed, would alter the pool hydrology and adversely impact the species therein (Trans-Pacific Consultants 1992). The Service and California Department of Fish and Game are working to find a buyer for the Skunk Hollow site.

A third population of *Orcuttia californica* exists on private unprotected land, southwest of Hemet in the Old Salt Creek drainage area. One pool near the road was disced. These pools are also potentially threatened by widening of an adjacent road.

Eryngium aristulatum var. *parishii* has the largest remaining distribution of the three plant species under consideration herein. In 1979, this species was known from 65 pool groups; by 1986, this plant remained in 61 pool groups. Although several sites receive some protection, the remaining pool groups are threatened by one or more of the following: Urban development, off-road vehicular traffic, habitat trampling associated with cattle, mowing or plowing, highway construction, drainage or watershed alterations (often due to adjacent urban development), military activities (e.g., driving equipment), and trampling associated with migrant workers illegally entering the United States (Bauder 1986).

Two pool groups in Kearny Mesa contain *Eryngium aristulatum* var. *parishii*. The first group is composed of only 5 pools and is a remnant of a broad expanse that once stretched over approximately 15 miles (Bauder 1986). These pools are surrounded by industrial development and have been invaded by weedy species. The second group is composed of 213 pools, but *E. aristulatum* var. *parishii* is only present in less than half of these pools. The southern portion of this pool group was eliminated by State Route 52.

Vernal pools in the Penasquitos area contain *Eryngium aristulatum* var. *parishii*. Two-thirds of these pools were purchased and preserved by the California Department of Transportation to mitigate impacts from highway projects. However, fences surrounding the preserve were broken, and there is evidence of damage by off-road vehicles in the pools. The remaining one-third of this pool group is on privately owned land, and development is proposed for the property.

Three pool groups in the San Marcos area contain *Eryngium aristulatum* var. *parishii*. Each group is on private property, surrounded by development. In 1991, one of these pool groups was vandalized; ditches were created in early spring thereby draining the pools and destroying vernal pool plants. It is unknown whether these pools have recovered from the disturbance.

Two pool groups on Camp Pendleton Marine Corps Base contain *Eryngium aristulatum* var. *parishii*. This species was once believed to be more common on the Base, but most of the plants have since been determined to belong to a different species currently under study (S. Blitz, San Diego State University, pers. comm., 1993). The two populations on the military base are near the unfenced boundary with a housing development. The potential exists that civilians would enter and trample the pools in the area, and that military operations such as tank activity could damage the pools.

The Riverside fairy shrimp has very narrow habitat requirements. This species is only found in deep lowland pools that retain water through the warmer weather of late spring (Clyde Eriksen, Claremont College, *in litt.*, 1992; Jamie King, University of California—Davis, *in litt.*, 1992). Riverside fairy shrimp will not hatch in pools that receive cool waters from early winter rains (Eriksen *in litt.*, 1992), such as those pools on the Santa Rosa Plateau, nor will they hatch in shallow pools.

The Riverside fairy shrimp is vulnerable to land use changes affecting the small number of pools that meet the species' strict habitat requirements. Of the four remaining pools supporting the fairy shrimp in Riverside County, only the Skunk Hollow vernal pool is greater than 1 acre in size. The Skunk Hollow vernal pool, as previously discussed, is within a planned development. Other sites supporting the fairy shrimp may lack some of the typical vegetation of vernal pools, but that condition probably reflects impacts from past agricultural activities. One pool is located within an approved tract for a housing development.

A third pool is on a parcel that is currently proposed for a housing development, adjacent to the Murrieta Golf Course and Highway 79. This pool is in an agricultural field near the Skunk Hollow pool and was disced. The Environmental Impact Report prepared by a consultant for the developer of this project failed to acknowledge the existence of the Riverside fairy shrimp on the site. Representatives of the landowner expressed a willingness to offer some protection for this site. However, as discussed above, a currently proposed road project would impact the pool.

A fourth pool that contains the Riverside fairy shrimp is located partially on private land and partially on the Pechanga Indian Reservation. The portion on private land was cultivated during 1990. The region's drought conditions over the last 2 to 3 years may have rendered the pool dry enough to be plowed. A fifth pool, located on the Pechanga Indian Reservation within a mile of the fourth pool mentioned above, was recently converted into a gravel pit (L. Dobson, Riverside County Transportation and Land Management Agency, pers. comm., 1992). Only one documented Riverside fairy shrimp population occurs in Orange County.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization is not known to be a factor for these four species; however, unrestricted collecting for scientific or horticultural purposes or excessive visits by individuals interested in seeing rare species can potentially impact these species as a result of increased publicity associated with listing under the Act.

C. Disease or Predation

Orcuttia californica is consumed by cattle in areas where vernal pools are within pastures, as discussed in Factor A. Grazing may occur prior to the setting of seed, that could affect reproductive success. The other three species are not known to be affected by disease or predation.

D. The Inadequacy of Existing Regulatory Mechanisms

Existing regulatory mechanisms are not sufficient to reduce the losses of *Orcuttia californica, Pogogyne nudiuscula, Eryngium aristulatum* var. *parishii*, or the Riverside fairy shrimp. Vernal pools, as isolated wetlands and waters of the United States, are regulated by the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act. The Corps generally does not require individual permits for impacts on less than 1 acre of wetlands or isolated waters of the United States above their headwaters. Most individual vernal pools are less than 1 acre in size.

Section 404 of the Clean Water Act has not historically provided adequate protection to these species from grading or fill activities for most pools. However, in October 1987, the Corps released a Public Notice proposing to

exercise its jurisdiction over vernal pools regardless of size or the lack of sensitive or endangered species in the pools. Since then, the Corps requires individual permits for the discharge of fill into vernal pools.

Section 404 regulates the discharge of fill material, but it does not regulate other activities such as grazing, off-road activity, and seeding with non-native species. Moreover, section 404 of the Clean Water Act does not regulate activities within the watershed (i.e., adjacent upland) of vernal pools. The watershed is an essential component of the vernal pool ecosystem. The disturbance and/or loss of watersheds can result in a greatly reduced volume and duration of water supply in vernal pools and thereby adversely affect all four of the proposed species.

Pools containing the federally listed *Pogogyne abramsii* are subject to individual permit actions under section 404 of the Clean Water Act because of the presence of an endangered species. In the past, *Pogogyne nudiuscula* may have occurred in the same pools as *P. abramsii*, east of Balboa Park and south of Mission Valley in San Diego; however, these pools were lost (Bauder 1986). *Orcuttia californica* and *P. abramsii* are not sympatric. *Eryngium aristulatum* var. *parishii* and *P. abramsii* occur in the same pool group areas in some cases, but do not share the same individual pools. The Riverside fairy shrimp and *P. abramsii* occur in the same pool group area in one case, but may not share the same individual pools. Thus, the listing of *P. abramsii* has not reduced the degree of threat to *P. nudiuscula*, *O. californica*, *E. aristulatum* var. *parishii*, or the Riverside fairy shrimp.

Pogogyne nudiuscula, *Orcuttia californica*, and *Eryngium aristulatum* var. *parishii* are listed as endangered by the California Fish and Game Commission (Commission). Listing by the Commission requires that individuals who wish to possess listed species obtain a memorandum of understanding from the California Department of Fish and Game. Under the California Endangered Species Act of 1985, State lead agencies are required to consult with the California Department of Fish and Game when their projects would affect State listed species. The prohibition against possession does not reduce the degree of threat resulting from adverse modification of vernal pool habitat incidental to other activities such as grading.

No formal programs currently exist to protect the Riverside fairy shrimp. In response to concerns expressed by conservation organizations, the California Department of Fish and Game, the Fish and Wildlife Service, and the County of Riverside conditioned one project to set one pool aside as an area for further study to provide temporary protection for the Riverside fairy shrimp. However, several proposed projects surrounding the pool are expected to adversely impact the pool watershed (Trans-Pacific Consultants 1992). On another site, the Riverside County Planning Director indicated that the County would attempt to prevent grading where an approved development would eliminate one pool. This site, however, was recently cleared. No Federal or State laws protect the Riverside fairy shrimp, and minimal protection given to the species was the result of local planning decisions.

In 1980, the City of San Diego instituted a vernal pool preservation program wherein developers pay a fee to a preservation fund when a project would destroy vernal pools. The amount of the fee required, $4,000.00 per vernal pool acre (usually only a small fraction of a typical acre of land containing vernal pools), is not sufficient to replace the lost habitat that, in some cases, sells for in excess of $100,000 per acre. The City of San Diego has accumulated approximately $700,000 (from collections and interest) through this program for the loss of over 800 pools, and has used this fund to purchase three sites consisting of a total of 21 acres, containing several vernal pools. The remaining small amount of the vernal pool preservation fund will be used for maintenance.

A study on San Diego County vernal pools conducted in 1986 revealed that little protection was afforded vernal pools (Bauder 1986). Vernal pool losses reported since 1979 indicate that 97 percent of pools covered under the City of San Diego's plan and the California Environmental Quality Act were lost. Those pool groups where permits pursuant to section 404 of the Clean Water Act were required showed a 26 percent reduction in the number of pools. Eight percent of the pools on federally-owned lands were lost (Bauder 1986).

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Other factors have greatly impacted the existence of these four vernal pool species, including introduction of non-native plant species, competition with invading species, trash dumping, fire, fire suppression activities, and drought. The low numbers of vernal pool habitats remaining and their scattered distributions make these species vulnerable to extinction due to stochastic events as well.

Many vernal pools on Otay Mesa are dominated by non-native plants such as the common grass *Lolium perenne*. This species is tolerant of inundation and crowds out the native vernal pool species such as *Pogogyne nudiuscula*, *Orcuttia californica*, and *Eryngium aristulatum* var. *parishii*. Ranchers introduced non-native species into some areas to increase the amount of forage available to livestock. Excessive cover of weedy non-native grasses was noted in six of the pool groups that contained *P. nudiuscula* and partially explained two extirpations of this species. The invasion of non-native plants and livestock grazing (as discussed in Factor C) apparently caused the extirpation of *O. californica* from 13 pools. Unprotected pool groups that contain *E. aristulatum* var. *parishii* are also threatened by invasion of weedy non-native plants.

These vernal pool plant species are also vulnerable to competition with marsh species as a result of urban water run-off, and with upland species as a result of a lack of water in pools, as discussed under Factor A. An increased domination of these marsh or upland species results in decreased abundance of obligate vernal pool taxa.

Trash dumping also degrades vernal pools. Chunks of concrete, tires, refrigerators, sofas, and other pieces of garbage or debris were found in pools containing these four species. This trash crushes or shades vernal pool plants, disrupts the hydrologic functions of the pool, and in some cases may release toxic substances. Trash dumping threatens the remaining pool groups of *Eryngium aristulatum* var. *parishii*.

During a fire in the summer of 1992, one-fourth of the *Pogogyne nudiuscula* population was burned, and extensive seed damage may have resulted. A fire break made during this fire isolated pools that were formerly connected during heavy rains, and very likely impaired the dispersal of seeds from the unburned pools to burned pools (S. McMillan, pers. comm., 1992).

In the drought year of 1989, *Pogogyne nudiuscula* was only found within 1 pool complex made up of 30 pools with a pool surface area totaling less than 1 acre (Ellen Bauder, San Diego State University, pers. comm., 1989). *P. nudiuscula* remains on a few sites on Otay Mesa in San Diego County.

The geographically restricted range and distribution of these species increases the possibility that agricultural activity, urban development, or other activities in or near these remnant vernal pool

ecosystems could destroy a significant portion of the species' remaining population and habitat. Unpredictable natural events, such as drought or fire, would be devastating to these species due to their fragmented and restricted range. This is especially important for *Orcuttia californica, Pogogyne nudiuscula,* and the Riverside fairy shrimp, as these species are restricted to a few sites.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list *Pogogyne nudiuscula, Orcuttia californica, Eryngium aristulatum* var. *parishii,* and the Riverside fairy shrimp as endangered. For the reasons discussed below, the Service is not designating critical habitat for these species.

As provided by 5 U.S.C. 553(d), the Service has determined that good cause exists to make the effective date of this rule immediate. Delay in implementation of the effective date would place the habitat of the species at risk.

Critical Habitat

Section 4(a)(3) of the Act requires, to the maximum extent prudent and determinable, that 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 these three plant species and the Riverside fairy shrimp is not prudent at this time. As discussed under Factor A in the "Summary of Factors Affecting the Species," these plant species are vulnerable to trampling. Curiosity seekers may investigate vernal pools and inadvertently further degrade the habitat of these three plants and the Riverside fairy shrimp by trampling. Publication of precise maps and descriptions of critical habitat for the three plants would increase the degree of threat to these plants from take or vandalism as discussed in Factor B and, therefore, could contribute to their decline and increase enforcement problems. The listing of the plants as endangered publicizes their rarity and, thus, can make these plants more attractive to researchers, curiosity seekers, or collectors of rare plants. All involved parties and landowners will be notified of the general location and importance of protecting the habitat of these species. Protection of the habitat of these species will be addressed through the recovery process and through the section 7 consultation process. Therefore, the Service finds that it would not be prudent to determine critical habitat for *Pogogyne nudiuscula, Orcuttia californica, Eryngium aristulatum* var. *parishii,* and the Riverside fairy shrimp at this time, because such designation 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 activities. 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. Such actions are initiated following listing. The protection required from Federal agencies, the prohibitions against taking and harm of the Riverside fairy shrimp, and 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 proposed. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Section 7(a)(4) of the Act requires Federal agencies to confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, 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 such 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.

Federal agencies expected to have involvement with these species include the Army Corps of Engineers and the Environmental Protection Agency due to their permit authority under section 404 of the Clean Water Act. Federal Aviation Administration jurisdiction would apply to vernal pools near Montgomery Field within the city limits of San Diego and at Brown Air Field on Otay Mesa. Miramar Naval Air Station contains vernal pools with not only the Riverside fairy shrimp and *Eryngium aristulatum* var. *parishii,* but also *Pogogyne abramsii,* which is presently listed as endangered. Camp Pendleton Marine Corps Base contains some vernal pools with *E. aristulatum* var. *parishii.* The Veterans Administration will be required to consider the consequences of funding housing loans where these species or their habitat occur. The Immigration and Naturalization Service will need to evaluate its activities and its effects on these species. This agency may be able to offer some help where trampling associated with Mexican citizens entering the United States is occurring. The Federal Highway Administration will likely be involved through potentially funding a portion of future highway construction that could affect these species. The Bureau of Indian Affairs may need to evaluate future proposals that may affect the Riverside fairy shrimp.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general prohibitions and exceptions that apply to all endangered plants. With respect to the three plants considered herein, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, would apply. These prohibitions, in part, make it illegal with respect to any endangered plant 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; remove and reduce to possession any such species from areas under Federal jurisdiction. In addition, the 1988 amendments (Pub. L. 100–478) to the Act makes it illegal to maliciously damage or destroy any such species on any area under Federal jurisdiction; or remove, cut, dig up, damage, or destroy any such species 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. Certain exceptions can apply to agents of the Service and State conservation agencies.

The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plants under certain circumstances. It is anticipated that few trade permits would ever be sought or issued for the three plant species since these species are not common in cultivation or in the wild. Additionally, these species have

specific germination and growth requirements including seasonal inundation, which would be difficult to recreate in cultivation.

The Act and implementing regulations found at 50 CFR 17.21 for endangered species set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, would make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt any of these), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed wildlife. It also would be illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that was taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits to carry out otherwise prohibited activities involving endangered wildlife are codified at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. In some instances, permits may be issued for a specified time to relieve undue economic hardship that would be suffered if such relief were not available. The Riverside fairy shrimp is not involved in trade, and such permit requests are not expected.

Requests for copies of the regulations on listed wildlife and plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, room 432, Arlington, Virginia 22203–3507 (703/358–2104).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, 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 is available upon request from the Carlsbad Field Office (see **ADDRESSES** section).

Author(s)

The primary author of this final rule is Ellen Berryman, U.S. Fish and Wildlife Service, Carlsbad Field Office (see **ADDRESSES** section). This rule was adapted from the proposed rule, the primary authors of which were Mr. Peter A. Stine and Ms. Nancy Gilbert, Carlsbad Field Office, and Ms. Karla Kramer, Eastside Federal Complex, 911 NE 11th Avenue, Portland, Oregon 97232–4181.

List of Subjects in 50 CFR Part 17

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

Regulations 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 § 17.11(h) by adding the following, in alphabetical order under Crustaceans, to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Speical rules
Common name	Scientific name						
*	*	*	*	*	*		
Crustaceans:							
*	*	*	*	*	*		*
Shrimp, Riverside fairy	*Streptocephalus woottoni.*	U.S.A. (CA), Mexico ..	NA	E	512	NA	NA
*	*	*	*	*	*		*

3. Amend § 17.12(h) by adding the following, in alphabetical order under the 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					
*	*	*	*	*		*
Apiaceae—Parsley family:						

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
* * *	*	* *		*		*
Eryngium aristulatum var. *parishii.*	San Diego—button-celery	U.S.A. (CA)	E	512	NA	NA
Lamiaceae—Mint family:						
* * *	*	* *		*		*
Pogogyne nudiuscula	Otay Mesa mint	U.S.A. (CA), Mexico	E	512	NA	NA
* * *	*	* *		*		*
Poaceae—Grass family:						
* * *	*	* *		*		*
Orcuitia californica	California—Orcutt grass	U.S.A. (CA)	E	512	NA	NA
* * *	*	* *		*		*

Dated: July 15, 1993.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

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