BEFORE THE SECRETARY OF INTERIOR

CENTER FOR BIOLOGICAL DIVERSITY Petitioner	)	Petition to list the Andrew's Dune Scarab Beetle (*Pseudocotalpa andrewsi* Hardy) as a Federally Threatened or Endangered Species

December 12, 2002

Petition to list the Andrew's Dune Scarab Beetle *Pseudocotalpa andrewsi* Hardy as a Federally Endangered Species

The Center for Biological Diversity hereby formally petitions to list the Andrew's dune scarab beetle (*Pseudocotalpa andrewsi* Hardy) as threatened or endangered pursuant to the Endangered Species Act, 16 U.S.C. 1531 et seq. (hereafter referred to as "ESA"). This petition is filed under 5 U.S.C. 553 (e) and 50 CFR 424.14 (1990), which grants interested parties the right to petition for issue of a rule from the Secretary of the Interior.

Petitioners also request that critical habitat be designated for the Andrew's dune scarab beetle concurrent with the listing, pursuant to 50 CFR 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

The entire known geographic range of the Andrew's dune scarab beetle is restricted to the Algodones Dunes of Imperial county in southeastern California and northern Baja California, Mexico. Habitat for this species has suffered destruction and modification by extensive off-road vehicle ("ORV") use during the past three decades. Current and proposed management of the species' habitat by the Bureau of Land Management ("BLM"), allows ORV use in the overwhelming majority of the areas known to harbor the species. Without management measures that prohibit ORV use in the majority of the species' habitat, the Andrew's dune scarab beetle faces a real and imminent threat to its continued existence in the wild.

INTRODUCTION

The Andrew's dune scarab beetle (*Pseudocotalpa andrewsi* Hardy) is highly restricted in range, found only at the Algodones Dunes in Imperial County, southeastern California and northern Mexico. *P. andrewsi* is the best studied of several species of scarab beetles (Family Scarabaeidae) endemic to the Algodones Dunes (Andrews et al. 1979, Hardy and Andrews 1980). Endemic species are generally considered more prone to extinction than widespread species (Rabinowitz 1981).

The Algodones Dunes are a large sand mass extending 64.4 km northwest to southeast into Baja California, Mexico, and are currently managed by BLM. The most significant human impact on the Algodones Dunes is use by ORV enthusiasts - the Dune system will occasionally experience upwards of 200,000 ORV users on a single busy weekend. ORVs at the Algodones Dunes include dune buggies and sand rails, whose tires can cut deeply into the sand even when accelerating on level ground (Stebbins 1995).

During daylight and early evening, perhaps 80% of desert fauna are buried underground, and are subsequently crushed and maimed by ORV tires (Stebbins 1995). Surveys comparing areas used by ORVs with unused areas at the Algodones Dunes indicate that ORVs cause drastic reductions in the abundance of several beetle species (Luckenbach and Bury 1983). Hardy and Andrews (1976) suggest that ORVs cause direct mortality of *P. andrewsi* during their periods of surface activity at dusk, which coincide with considerable ORV traffic. Petitioners believe that the Andrew's dune scarab beetle is endangered due to the historic, ongoing, and imminent destruction of its habitat by extensive ORV use of the Algodones Dunes.

The Andrew's dune scarab beetle was proposed for listing as threatened under the ESA by the U.S. Fish and Wildlife Service ("FWS") in 1978 (43 FR 35636-43). At that time, FWS noted that "this action is being taken because of their decreased population levels and anticipated adverse modification of their habitat." FWS stated in the proposed rules that "the continued disruption of dune troughs by off-road vehicles prevents the accumulation of dead organic matter upon which the immature stages of this beetle feed." At the time the Andrew's dune scarab beetle was proposed for listing, the ESA required listing proposals to be finalized within two years or withdrawn. In October 1980, FWS issued a notice to withdraw the proposal because final rulemaking had not been completed within the 2-year deadline following the date of the proposal (45 FR 65137-01). ESA protection for *P. andrewsi* was therefore denied due to the failure of FWS to meet mandatory statutory deadlines rather than due to new scientific data indicating a listing was not warranted.

FWS's failure to finalize the 1978 proposed listing rule resulted in over two decades of Dunes management by BLM that failed to take into account the impacts of ORVs on the Andrew's dune scarab beetle and the other rare and endangered fauna of the Dunes. As of December 2002, BLM is proposing a new management plan that not only fails to directly protect the beetle, but also eliminates interim closures designed to protect a threatened plant found at the Dunes. The elimination of these interim closures will further imperil the Andrew's dune scarab beetle, necessitating its protection under the ESA.

Figure 1. Andrew's dune scarab beetle (*Pseudocotalpa andrewsi*) from the central Algodones Dunes, Imperial County, California, February 2002.

I. TAXONOMY

Beetles are of the insect order Coleoptera, one of the largest and most diverse orders of living organisms in the world (Hogue 1993). The Andrew's dune scarab beetle is one of at least three in the arenophilic genus *Pseudocotalpa* (Hardy 1974). Hardy (1971, 1974) and Lawrence and Newton (1995) classify *P. andrewsi* as:

Order Coleoptera
Suborder Polyphaga
Series Scarabaeiformia
Superfamily Scarabaeoidea
Family Scarabaeidae
Tribe Rutelinae
Subtribe Areodina
Genus Pseudocotalpa

The genus *Pseudocotalpa*, and the species *P. andrewsi*, was first described by Hardy (1971). The genus is distinguished from related genera in the subtribe Areodina by the distinctive deeply concave shape of the clypeus, the underdeveloped prothoracic postcoxal spine or knob (as opposed to other genera in which the knob is evident), and the enlarged, deeply grooved maxillary palp (Hardy 1971,1974). Two other known species of *Pseudocotalpa* include *P. guilianii*, found at Big Dune in South Central Nye County, Nevada near the border with California and Death Valley National Monument, and *P. sonorica*, found in a dune mass approximately 10 miles northeast of Puerto Penasco, Mexico, on Highway 8, one or two miles northeast of the highway (Hardy 1974).

II. DESCRIPTION

The most distinctive feature of Coleoptera are the thick, hard or leathery forewings, called elytra (Hogue 1993). Elytra cover and protect the hind wings and meet in a straight line down the back. Only the hind wings are use for flight. Beetles undergo holometabolism, or complete metamorphosis from larvae to adult. The family Scarabaeidae ("scarab beetles") includes june beetles, chafers, and dung rollers. A feature common to all scarab beetles is antennae with a terminal club composed of leaf-like plates which may be opened and closed (Hogue 1993).

The Andrew's dune scarab beetle is robust, with well-developed flight wings, and a prothorax, scutellum, and abdomen covered with long, pale, fine hairs (Figure 1, above). The labrum is thin, bilobed, and at least three times wider than long. For a complete description, see Hardy (1971). *P. andrewsi* differs morphologically from *P. guilianii* and *P. sonorica* in its smaller size, ranging from 13.5 to 17.5 mm as opposed to greater than 17 mm. The elytra and prothorax of both *P. andrewsi* and *P. guilianii* are hairless in the middle, while the elytra and prothorax of *P. sonorica* are entirely covered with fine, erect hairs. The middle of the frontal-clypeal suture of *P. andrewsi* is abruptly arcuate, while that of *P. guilianii* is evenly arcuate (Hardy 1974).

III. CURRENT DISTRIBUTION

Best available scientific data indicate that *P. andrewsi* is a species endemic to areas of fine sand at the Algodones Dunes in Imperial County, California and northern Mexico (Andrews et al. 1979, Hardy and Andrews 1980). The Algodones Dunes are the largest sand dune system in California and one of the largest in the United States. The Dune system is approximately 64.4 km long, of which the southernmost 6.4 km extend into northern Mexico. The system varies in width from 4.8 km to 9.7 km, with the narrowest point being at the northernmost tip. Dune crests range between 60 m to greater than 90 m high (BLM and CDFG 1987).

Previous specimens of *P. andrewsi* were recorded from around Glamis, with some unconfirmed records elsewhere on the Algodones Dune system. Andrews et al. (1979) note that previous to their 1978 survey, 201 specimens had been taken from Glamis, two specimens from 1 mile west of Glamis, one specimen from 3 miles northwest of Glamis, and one specimen from 2 miles southeast of Glamis. One possible (questionable) specimen was taken from an area approximately 5 miles south of Ogilby.

According to available documents, four sets of surveys for the Andrew's dune scarab beetle have been conducted at the Algodones Dunes. Surveys conducted in 1977, 1978, and 1979 in the Algodones Dunes (Andrews et al. 1979, Hardy and Andrews 1980) provided the first detailed summary of *P. andrewsi* distribution and behavior from the Dune system, and a 1990 survey was apparently conducted but petitioners could not obtain the report (see footnote on page 14). To date, the Andrew's dune scarab beetle appears to be widely distributed upon the main dune mass, but no observations have been documented outside the main Algodones Dune system.

IV. LIFE HISTORY

A. Habitat

The Algodones Dunes are a sand belt located along the southeastern border of the Imperial Valley in southeastern California (Figure 2). The sand was derived from wave action during the formation of beaches along the fossil Lake Cahuilla (Song 1974). Lake Cahuilla was created by a drainage change of the Colorado River during the Pleistocene pluvial period. Geologically, the Cahuilla Basin is at the northern end of a large trough which extends several hundred kilometers south and is largely occupied by the Gulf of California (Song 1974). Currently, the bottom of the Cahuilla Basin is occupied by the Salton Sea. The Algodones Dunes block a drainage system which once extended from the southern Chocolate and Cargo Muchacho mountains to the bottom of the Cahuilla Basin (Song 1974).

The northern part of the Algodones Dunes is a ridge with the highest peaks in the center. The middle section is characterized by slip faces which cross the main trend, becoming more prominent towards the south. In the southern part of the dunes, some slip faces overlook flat-floored sand-free depressions (Song 1974). The central and southern parts of the Dune system are composed

of nearly parallel ridges along the western edge, and a 2.4-km-wide sandy apron which ends feather-like against the desert floor along the eastern edge. Andrew's dune scarab beetles have been found at both the interior and perimeter of the dunes (Hardy and Andrews 1980). Generally, both large and small individuals are found in the dune interiors, while only smaller individuals are found on the dune perimeters (Hardy and Andrews 1980).

P. andrewsi habitat was characterized as creosote bush scrub by Hardy and Andrews (1980), but described as psammophytic or desert dune sand plant community by BLM and CDFG (1987). This habitat includes areas of active and partially stabilized dunes with widely scattered perennial vegetation cover (BLM and CDFG 1987). Psammophytic vegetation is adapted to deep water percolation and relatively high sand fluidity and mobility, and many of the perennial shrubs of the deep sands are endemic to the Algodones Dunes (Luckenbach and Bury 1983). The proposed management plan DEIS (BLM 2002) describes *P. andrewsi* habitat as the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodlands habitats. *P. andrewsi* have been observed flying around bushes after twilight emergence, including creosote *(Larrea tridentata),* California buckwheat, *(Eriogonum deserticola),* Palo Verde *(Cercidium floridum*), and desert needle *(Palafoxia arida)* (Hardy and Andrews 1986). The Algodones Dunes are wet just a short distance below the surface due to the sponge-like effect of the sand (Song 1974). During the day beetles are buried at the interface between wet and dry sand, at depths varying from 5 to 30 cm (Hardy and Andrews 1980).

In general, insects and other invertebrates have evolved several strategies to survive the harsh conditions of the desert. As noted above, at least three species of scarab beetle are endemic to the Algodones Dune environment (Andrews et al. 1979). *P. andrewsi* appear to be habitat specialists of areas of fine sand in creosote bush or desert psammophytic scrub in the Algodones Dune system (Hardy and Andrews 1980, BLM and CDFG 1987).

B. Activity Patterns

Observations of *P. andrewsi* have been made from February through May, with most from mid-April through early May (Hardy and Andrews 1980). Generally, observations indicate that the beetles emerge at twilight, experience a brief period of activity, and rapidly disappear, with the exception of a few stragglers. *P. andrewsi* is active on the dune surface for only 10 to 30 minutes an evening for 3 to 4 months, in breeding clusters only 2 to 3 m wide, and for the rest of the year it lives buried in the sand (Luckenbach and Bury 1983).

Hardy and Andrews (1980) recorded specific activity patterns of a probable colony of *P. andrewsi* (n = ~10). During the day, Andrew's dune scarab beetles occupy the interface between wet and dry sand, at a depth of about 5 to 30 cm. Activity begins about 2 hours prior to dusk, as dimples created by surfacing beetles appear on the sand. Beetles burrowing to the surface will halt just short of the surface and wait, possibly gauging the light intensity. As the light intensity decreases, beetles gradually move closer towards the surface until the head is exposed. The individuals remain quiet until light intensity reaches about 44 lux (i.e., 4 foot candles) when they quickly emerge to the surface and immediately take flight. All beetles emerge within a few minutes of

each other. Periods of strong winds sometimes preclude emergence, though beetles will still rise to the surface.

After swarming together for a few minutes (see section IV.C. "Reproduction"), individuals break away from the swarm and fly rapidly over the dunes a few centimeters above the surface. Flight activity from the moment of first emergence to the last disappearance is from 10 to 30 minutes. After the flight, individuals land on the surface of the sand and immediately dig in or wander along the surface for up to 50 cm before digging in. The distinctive marks left by burrowing beetles allows for daytime surveys of *P. andrewsi* by locating burial points and excavating the beetles.

C. Reproduction

Reproductive behavior was described Hardy and Andrews (1980). Immediately after emerging at twilight, male and female beetles fly for a few minutes in aggregations around nearby shrubs such as creosote, California buckwheat, palo verde, and desert needle. Swarming behavior around bushes may be attributed to males and females searching for mates or females dropping eggs near possible host plants. As most swarms occurred around creosote, most adult emergences were in areas above roots from nearby creosote bushes, and other *Psuedocotalpa* species use creosote for mating, creosote is a likely host plant for larvae. Whether larvae are root feeders on these bushes is unknown, but the only specimen found of a larval *P. andrewsi* was located near an area of dense creosote, adding to evidence of creosote as a host plant.

After swarming, a female will then alight on the open sand. Several males will converge upon her and attempt copulation. Females may release a pheromone for mate identification.

E. Natural Sources of Mortality

Predation, particularly by night hawks, is an important source of mortality of *Pseudocotalpa*. While no data specific to *P. andrewsi* exist, foxes and coyotes are known to feed upon emerging beetles in other areas (Hardy and Andrews 1980).

P. andrewsi is active on the dune surface for only 10 to 30 minutes an evening for less than 4 months of the year, in breeding clusters only 2 to 3 m wide. For the rest of the year it lives buried in the sand. The February through May active season coincides with a heavy-use season for ORVs because the weather is cooler at the Algodones Dunes during this time. Luckenbach and Bury (1983) note that vehicles probably crush arthropods such as the Andrew's dune scarab beetle because considerable ORV traffic takes place during the cooler evening and night-time hours in which the beetles are active.

V. THREATS TO THE SPECIES

Threats to the Andrew's dune scarab beetle include: a highly restricted geographic range; specialized habitat needs; and historic, ongoing, and future disturbance from heavy ORV use of the Algodones Dunes (Andrews et al. 1979, Hardy and Andrews 1980, Luckenback and Bury

1983). Vulnerability from anthropogenic (historic, ongoing, and imminent human-caused habitat destruction) and environmental (restricted range, habitat specialist) pressures puts *P. andrewsi* at severe risk of extinction.

A. Restricted range/habitat specialist

Given their restricted geographic ranges, endemic species are generally considered more prone to extinction than widespread species (Rabinowitz 1981). The family Scarabaeidae shows a great deal of endemism and adaption to the dune environment (Andrews et al. 1979). In fact, at least three species of scarab beetle are endemic to the Algodones Dunes, including *P. andrewsi* Hardy, *Anomala hardyorum* Potts, and *A. carlsoni* Hardy (Hardy and Andrews 1980). Because *P. andrewsi* is an endemic organism, no colonization source exists should the population be eliminated. In addition, habitat specialists are more vulnerable to extinction than habitat generalists (Sarre et al. 1995, Fischer and Stocklin 1997, Henein et al. 1998). Andrew's dune scarab beetles are habitat specialists to areas of fine sand in creosote bush/desert psammophytic scrub in the Algodones Dune system (Hardy and Andrews 1980, BLM and CDFG 1987).

B. Historic, ongoing, and potential disturbance from ORVs

A study of ORV use in California conducted by the State Parks Department reports a 90% increase in registrations of dune buggies and sand rails between 1983 and 2000 (Figure 3; California State Parks 2002). The DEIS (BLM 2002) states that over 3 million visitor-use days occur annually at the Algodones Dunes. Dune buggies and sand rails are the most popular ORVs used on the Algodones Dunes. These are relatively light vehicles with open tubular frames, rear-mounted engines, and large tires that may be equipped with paddles for better traction in loose sand (Bury et al. 1977). Three and four-wheeled ATVs with wide tires are also popular. Four-wheel-drive trucks and motorcycles are used on the Dunes as well.

Several published studies have documented the deleterious effects of ORVs on desert arthropods as well as on mammals, birds, amphibians, reptiles, and vegetation (Busack and Bury 1974, Hardy and Andrews 1976, Bury et al. 1977, Bury and Luckenbach 1983, Luckenbach and Bury 1983, Brooks 1995, Stebbins 1995, Brooks 1999). Two such studies (Hardy and Andrews 1976, Luckenbach and Bury 1983) were conducted in the Algodones Dunes. Hardy and Andrews (1976) reported that in areas of the Algodones Dunes containing pockets of accumulated vegetative material or crusted deposits, which are possible larval nurseries, ORVs could damage the surface so that ecological niches for *Pseudocotalpa* would be destroyed. Luckenbach and Bury (1983) compared paired unused versus ORV-used plots and animal tracks along sand sweeps in the Algodones Dunes, and found ORVs significantly reduced the biota. The authors investigated effects of ORVs on: vegetation species composition and biomass; lizard species composition, abundance, and biomass and rates of tail loss; mammalian species composition, abundance, and biomass; and animal tracks (including beetles). Areas with heavy ORV use had little or no vegetation: control plots contained 2.5 times the number of plant species, 10 times the density, 10 times the cover, and 4 times the volume of shrubby perennials as compared with ORV-impacted plots (Bury and Luckenbach 1983). The authors noted that "[i]t is obvious that ORVs have had

a major detrimental impact on dune plant communities. In addition, control plots had 1.8 times the number of vertebrate species, 3.6 times the number of individuals, and 5.8 times more biomass of reptiles than ORV areas, and 1.3 times more species, 2.2 times more individuals, and 2.2 times the amount of biomass of rodents than ORV plots." Arthropod (mostly beetle) tracks were 24 times more abundant in control than in ORV-impacted plots (Bury and Luckenbach 1983). Figure 4 shows the significant reduction in number of beetle tracks in ORV versus unused areas at the Algodones Dunes. The authors concluded that "[t]he findings of this study clearly demonstrate that ORV activities in the Algodones Dunes are highly detrimental to dune biota. Both herbaceous and shrubby perennial vegetation are greatly reduced in habitats where ORVs operate. The sand-adapted desert kangaroo rat (*Dipodomys deserti*) and fringe-toed lizard (*Uma notata*) are severely reduced in areas frequently used for ORV recreation. Judging from information obtained on tracks, there also is a marked decline in the number of arthropods in ORV-used areas." [*emphasis added*]

Busack and Bury (1974) recorded negative effects of ORVs on three lizard species in the Dove Springs area of the Mojave desert, near California City. One species, *Callisaurus wislizenii*, was found only in undisturbed areas, and number and biomass of *Uta stansburiana* and *Cnemidophorus tigris* were higher in undisturbed versus heavily and moderately used areas. Bury et al. (1977) compared reptile, mammal, and bird species composition, abundance, and biomass in control areas, pit areas, and areas moderately or heavily used by ORVs in five creosote communities throughout the Mojave desert. Diversity, density, and biomass of all taxa were inversely related to level of ORV use. Results showed an average of 1.63 more species of reptiles and 1.25 more species of small mammals on control than ORV-used sites. The number of individuals in heavily used and pit areas was 55% and 20%, respectively, of control sites, and biomass estimates were only 23% and 17%, respectively, of control sites. The authors concluded that:

> "The impact of ORV activity on the desert vertebrate fauna is both direct and indirect. The ORVs have a direct impact by killing or maiming ground-dwelling animals; we have observed such effects in the field. ORVs can also destroy wildlife by crushing ground nests or breaking bushes and shrubs containing nests and cover. ORVs collapse burrows that are important retreats for tortoises and other wildlife. Harassment by ORV activity may place a considerable energy strain on individuals and may cause incubating birds to abandon nests. Noise from ORV activity probably interferes with the establishment and maintenance of territories. Indirect effects are perhaps the most significant and result from the destruction of vegetation and disturbance of soil. Vegetation is destroyed by crushing and root exposure...One result is a reduction in the number of spring annuals in areas of ORV use. The loss of these annuals likely means the loss of seeds and forage as well as the loss of arthropods that feed on these annuals." [*emphasis added*]

Brooks (1995, 1999) found that the Desert Tortoise Research Natural Area, a fenced reserve in the western Mojave desert, contained significantly higher abundance and species richness of birds, lizards, and nocturnal rodents than outside the reserve, as well as greater aboveground live plant and seed biomass.

In sum, in a comprehensive review of scientific literature regarding ORV impacts on desert flora and fauna, petitioners were unable to find a single study documenting positive or even neutral effects of ORVs. In fact, studies of arthropods on the Algodones Dunes (Hardy and Andrews 1976, Luckenbach and Bury 1983) show that beetles are significantly reduced in ORV-used areas (Figure 4). *Pseudocotalpa* were found by Hardy and Andrews (1980) to be "sensitive to activity in the areas where emergence and swarming take place, either remaining immobile in the sand and not emerging or rapidly decamping from the area of disturbance if already in flight." Unfortunately, the same sandy dunes that host the species are also strongly favored by ORV enthusiasts. Timing of emergence and observations (February through May) coincides with a heavy ORV-use season in the Algodones Dunes due to cooler weather conditions. Hardy and Andrews (1980) found that most beetles spend the day buried at a depth of 5 to 8 cm. This depth is not sufficient to protect individuals from the shearing activity of dune buggy, sand rail, and other vehicle tires (Stebbins 1995).

In recognition of these threats to the species, a flurry of activity around the Andrew's dune scarab beetle occurred during the 1970s: a proposal by FWS to list *P. andrewsi* in 1978 (43 FR 35636-43) and formal surveys for the species at the Algodones Dunes in 1977, 1978 and 1979 (Andrews et al. 1979, Hardy and Andrews 1980). All surveys indicated that the species was restricted to sandy areas of creosote/psammophytic scrub habitat in the Algodones Dunes. In addition, BLM proposed to conduct baseline and permanent monitoring studies for the Andrew's dune scarab beetle in a 1987 Wildlife Habitat Management Plan ("HMP") for the Algodones Dunes (BLM and CDFG 1987, pp. 21-22):

> **a. Baseline Studies**
>
> Data is [*sic.*] available for 36 study sites within the [Wildlife Habitat Area] (Hardy & Andrews, n.d.). Additional baseline work will be done to supplement these records and to determine which sites will be designated as permanent plots to monitor beetle trend. Up to 10 permanent plots will be designated, with habitat in all use categories (C, L, M. and I) represented.
>
> **b. Monitoring Studies** [*heading added by petitioners*]
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> Permanent plots will be evaluated biennially, and results will be compared to existing information to determine trend, until a satisfactory amount of data are gathered. Supplementary and monitoring studies will be through contract, funded by State OHV Commission contributed funds and by California Environmental License Plate contributed materials.

Follow-up surveys were apparently conducted in 1990 (Scarabaeus Associates) but terminated shortly thereafter, despite the legal mandate to conduct such surveys biennially. To the knowledge of petitioners, surveys for Andrew's dune scarab beetles have not been conducted since that time. Therefore, no trend data are available as required by the HMP.

As of 1980, the Andrew's dune scarab beetle appeared to be distributed upon the main dune mass of the Algodones Dunes, but no observations have been documented outside the main Algodones Dune system (Hardy and Andrews 1980). Despite concern for the species voiced in the 1970s and 1980s, use of ORVs has continued unabated. The areas that held the most abundant colonies of the species (i.e. near Glamis and along the eastern dune margin) have been severely impacted over the past twenty years. These areas are largely denuded of vegetation, and therefore the beetle is likely extirpated or severely reduced in these areas. Given known adverse impacts of ORVs on desert beetles and on other fauna and flora, current and projected ORV use and BLM management threatens the continued existence of the species.

As of December 2002, over 40,000 acres in the central portion of the Algodones Dunes are currently closed to ORVs to protect the Peirson's milk vetch (*Astragalus magdalenae* var. *peirsonii*). However, the proposed management plan scheduled to take effect in early 2003 would permit ORVs in 198,220 acres and protect only 27,695 acres which are already designated "wilderness." The DEIS proposed this plan despite known adverse impacts of ORVs on *P. andrewsi* and lack of required monitoring for the species. Such a proposal indicates a failure of existing regulatory mechanisms to ensure the continued existence of the Andrew's dune scarab beetle, and threatens the habitat of the beetle with imminent destruction.

VII. CRITERIA FOR ENDANGERED SPECIES ACT LISTING

THE ANDREW'S DUNE SCARAB BEETLE IS ENDANGERED UNDER THE ESA.

The Service is required to determine, substantiated solely on the basis of the best scientific and commercial data available, whether a species is endangered or threatened because of any of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) the inadequacy of existing regulatory mechanisms; (3) overutilization for commercial, recreational, scientific or educational purposes; (4) disease or predation; or (5) other natural or manmade factors affecting its continued existence. 16 U.S.C. § 1533(a)(1) and 1533(b).

Petitioners believe that factors (1), (2), and (5) have played a significant role in endangering the continued existence of the Andrew's dune scarab beetle. The most immediate threats to its existence is a highly restricted geographic range, as the species is known to occur only at the Algodones Dunes, and impending plans to open currently protected areas of the Dune system to ORVs. *P. andrewsi* is in dire need of the additional protections that only listing under the ESA can provide.

1. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>.

As detailed in section V. above ("Threats to the Species"), published studies have documented the deleterious effects of ORVs on desert arthropods as well as on mammals, birds, amphibians, reptiles, and vegetation (Busack and Bury 1974, Hardy and Andrews 1976, Bury et al. 1977, Bury and Luckenbach 1983, Luckenbach and Bury 1983, Brooks 1995, Stebbins 1995, Brooks 1999). No

studies showed positive or even neutral impacts of ORVs on desert ecosystems.

The swarming behavior of adult *P. andrewsi* during the active season (generally February through May) render entire colonies vulnerable to destruction should a dune buggy traverse the area at the wrong time. One study of impacts of ORVs on the biota of the Algodones Dunes showed that arthropod (mostly beetle) tracks were 24 times more abundant in control than in ORV-impacted plots (Luckenbach and Bury 1983). Thus, increased ORV use of the Algodones Dunes will likely curtail the range of the beetle within the Dune system. Because *P. andrewsi* is endemic to the Dunes, no colonization source exists should the population be eliminated. Therefore, the species is particularly vulnerable to extinction.

While ORVs can directly kill individual Andrew's dune scarab beetles when they are burrowed in sand or flying at the surface during twilight emergence, ORVs are also proven to adversely modify dune habitat. Desert beetles depend on their substrate for food, refuge from heat, and desiccation (Carpelan 1995). Accumulations of vegetable matter collected in wind-made troughs probably serve as nurseries for the larval stages of *P. andrewsi*. Creosote bushes have been identified as potential host plants for the species. Because *P. andrewsi* reproduction is concentrated at one time of the year (mid-April through early May), obliteration by ORVs of accumulated vegetable matter in which larvae develop eliminates an entire generation of beetles because reproduction is uni-voltine (i.e., only one generation per year) (Carpelan 1995). Carpelan (1995) describes the mechanism by which dune buggies adversely modify *P. andrewsi* habitat:

> "Dunes become stabilized when the prevailing wind has blown the fine particles from the surface, leaving exposed material too heavy to be blown off. Disturbing this stabilized crust not only destabilizes the dune, but makes it difficult for the burrowers; and it may destroy the accumulations of organic matter – the food supply and the nursery. Dune buggies, then, are the agents of destruction of the plants, produced both on the dunes and adjacent to them, which are the limited food supply of the dune community."

Hardy and Andrews (1976) concluded that ORVs destroy plant growth within and near the Algodones Dunes, scatter or crush accumulations of organic matter likely used by *P. andrewsi* larvae for nurseries, disrupt layers of crust which stabilize the dunes, and may upset beetle reproduction. If currently protected areas of the Algodones Dunes are re-opened to ORVs, as proposed in the DEIS, habitat for the Andrew's dune scarab beetle will be modified or destroyed and their range within the Dune system will likely be curtailed. The species is especially vulnerable because it is endemic to the Dunes.

2. <u>Inadequacy of existing regulatory mechanisms</u>.

The Andrew's dune scarab beetle has been identified as a species of concern for the past three decades. The tenuous status of the species, including its restricted range and specialized habitat needs, has long been known to BLM, the presiding land-management agency at the Algodones Dunes (Andrews et al. 1979, Hardy and Andrews 1980, BLM and CDFG 1987). In addition, adverse impacts of ORVs on *P. andrewsi* and other imperiled dune species are well-known to BLM, as concerns have been brought to the attention of the agency since the 1970s (Hardy and Andrews 1976) and numerous studies have been published in scientific journals regarding ORV impacts. However, use of ORVs continued in sensitive beetle habitat until the present. In light of known

deleterious impacts of ORVs on *P. andrewsi*, regulatory mechanisms to protect the species should necessarily include permanent protection of its creosote/psammophytic scrub habitat throughout the Algodones Dunes, including stringent enforcement of closures. Unfortunately, the preferred alternative in the DEIS involves relaxed conservation measures for the Andrew's dune scarab beetle, including re-opening thousands of acres of currently protected habitat to ORV use. Studies show that even limited ORV use severely impacts desert fauna (see section V. "Threats to the Species").

a. ***Historic management failures***

Three planning documents for the Algodones Dunes Wildlife Habitat Area ("WHA") have addressed management for *P. andrewsi* (BLM and CDFG 1987), and are summarized below in chronological order.

- **1972 Recreation Management Plan**

  The Imperial Sand Dunes Recreation Management Plan called for the establishment of a Natural Area between Mammoth Wash and Highway 78. The Natural Area was closed to ORVs except for a vehicle access corridor, but the corridor was subsequently closed in 1977 because ORVs were negatively impacting plants and wildlife.

- **1980 California Desert Conservation Area Plan**

  In 1980 BLM developed the CDCA Plan for management of the entire California Desert. The CDCA Plan called for controlling ORV use and "protecting, stabilizing, and enhancing wildlife resource values." The CDCA Plan also designated use classes in the WHA, including Class C (suitable for wilderness), Class L (limited use), Class M (moderate use) and Class I (intensive use).

- **1987 Recreation Area Management Plan for the Imperial Sand Dunes**

  The 1987 RAMP called for a reduction in the proposed level of recreation development and dispersal of intensive recreational use within Class I areas.

The 1987 RAMP included the Algodones Dunes Wildlife Habitat Management Plan (HMP), implemented under the authority of the Sikes Act (PL 93-452). The HMP mandated biennial surveys for the Andrew's dune scarab beetle: "Permanent plots will be evaluated biennially, and results will be compared to existing information to determine trend, until a satisfactory amount of data are gathered. Supplementary and monitoring studies will be through contract..." (p. 22). According to available documents, apparently only one set of surveys was ever conducted, although the survey reports could not be located by BLM, FWS or petitioners and the results are therefore unknown.[1] Apparently no further surveys have been conducted since that time.

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[1]Petitioners were only aware of the surveys based on a 1991 citation found in an "Annotated Bibliography of the Natural History of the Algodones Dunes," compiled by James Dice of the California Department of Fish and Game (CDFG; 23 May 2000), entitled "A study of Andrews' dune scarab beetle, a final report to the Bureau of Land Management on Contract B950RFP10008," conducted by Scarabaeus Associates. Petitioners' efforts to obtain the report proved fruitless, as no BLM, DFG, or FWS employee could locate the document.

The HMP mandated that action be taken to determine distribution and status of endemic invertebrates. BLM acknowledged that "[a] number of uniquely adapted invertebrates have been recorded in the WHA... One or more of these species may warrant consideration for special status designation by BLM, CDFG, and/or USFWS. More information on these species' distribution and status in the WHA is needed in order to make this determination," (BLM and CDFG 1987, p. 16). Implementation was to "conduct surveys and submit results to CDFG, including the California Natural Diversity Data Base and USFWS... If apparently unique forms are found, determine their taxonomic status... If unique taxa are present, add to BLM's Sensitive Species list...to ensure special management consideration," (BLM and CDFG 1987, p. 17). Most importantly, "the impacts to resources of special management concern resulting from implementation of [land use] decisions must be determined in order to ensure that no special status species' continued existence is jeopardized, and that impacts do not exceed those anticipated during the decision making process... Implementation [is to] conduct a monitoring program," (BLM and CDFG 1987, p. 18). Thus, permanent monitoring of *P. andrewsi* was mandated in the HMP to determine special status and to ensure that management decisions do not jeopardize the species, but surveys have not been conducted for the past decade. Meanwhile, use of ORVs continued unabated throughout sensitive *P. andrewsi* habitat until October 2001.

The 1987 RAMP also stipulated that localized surveys be conducted for the Andrew's dune scarab beetle prior to approval of particular development projects. These projects included:

- Construction of two additional 8-vault toilet units in the Glamis area.
- Construction of a four-bay sanitary dump station in the Glamis area.
- Construction of a new ½-mile paved access road and bridge over the Coachella Canal to provide access from the Gordons Well Interchange to the Dune Buggy Flats area.
- Construction of an eight-vault toilet unit at the Dune Buggy Flats (Gordons Well) camping area.
- Extension of Grays Well Road west one mile to the Gordons Well Interchange, and construction of a new bridge over the All-American Canal.
- Establishment of the Gordons Well overpass as a "designated segment" for OHV use under Section 38026 of the California Vehicle Code.
- Designation of an OHV access corridor between the Grays Well (Plank Road) and Dune Buggy Flats areas, utilizing the Grays Well Road bridge over the All American Canal, and Gordons Well Overpass, and the Coachella Canal Bridge providing access to Dune Buggy Flats.
- Designation of a 150-acre concession development zone west fo Grays Well (Plank Road) for leasing approximately 1991.
- Designation of a 300-acre concession development zone on the west sided of the Imperial Sand Dunes (Gecko) Road about threee miles south of State Highway 78, for leasing approximately 1995.
- Designation of a 200-acre concession development zone on the flats between the Southern Pacific Railroad and the dunes approximately one mile south of Glamis, for leasing approximately 1995.

No available documents indicate that such surveys were conducted, while many of these development projects have been approved and completed.

b. Current management failures.

The DEIS, released in March 2002, states that "[b]ecause of budgetary considerations and environmental factors, portions of the 1987 RAMP have not been implemented...The 1987 [RAMP] is outdated and will be fully replaced by the new RAMP"(Chapter 1-8). However, a lack of funding was not a valid reason to ignore mandatory requirements of the 1987 RAMP. Regarding *P. andrewsi*, the DEIS states that "little is known about the biology of this beetle, [and] current information about the distribution and preferred habitat at the Plan Area is not available...No information about threats to this species is available" (Chapter 3-39). Clearly this assessment of the species is not just woefully inadequate, but completely inaccurate given all the information petitioners have presented above, including information from BLM itself. In addition, the HMP mandated collection of demographic and distributional information through biennial surveys, which would have provided additional information regarding population growth rates, survival, reproduction, and habitat use. No data were presented in the DEIS regarding distribution of *P. andrewsi* in the Algodones Dunes, although such data are required before land-use decisions are made to ensure the continued existence of the species is not jeopardized.

The DEIS recognizes that "OHV activity tends to be concentrated within the psammophytic scrub. As a consequence, some special-status wildlife species such as the Colorado Desert fringe-toed lizard and endemic dune beetles occurring in these dunes would be killed or injured by OHV activity," (Chapter 4-15). However, the preferred alternative in the DEIS (Alternative 2) would maintain as off-limits to ORVs only the relatively small (27,695 acre) portion of the Algodones Dunes already designated as "wilderness." Figure 5 shows proposed land uses of the Algodones Dunes under Alternative 2. The preferred alternative in the DEIS would allow an astonishing 198,220 acres of the Algodones Dunes to be open to ORV use. Table 1 below (Table 4.2-3 of the DEIS, Chapter 4-17) describes percentage and acreage of dune habitat types to be closed or open to ORV use in Alternative 2. It must be noted that wording in the table is erroneous because "controlled" areas are also "open" to ORVs.

Table 1. Habitat Types by Estimated Areas within Closed, Controlled Access, and Open areas under Alternative 2 of DEIS. From BLM (2002), Table 4.2-3.

Habitat Type	Closed to OHV Use (Acres)	Percent Closed	Controlled Access (Acres)	Percent Controlled Access	Open to OHV Use (Acres)	Percent Open
Creosote Bush Scrub	3,188	6	30,019	58	18,668	36
Psammo-phytic Scrub	16,956	16	24,726	23	66,976	61
Microphyll Woodland	7,551	12	37,749	58	20,082	30

In sum, administrative plans and legal requirements to specifically monitor and conserve the Andrew's dune scarab beetle have systematically been ignored, reneged, or abandoned by BLM. Lack of enforcement of the law has resulted in no protection for the species until interim closures were implemented in October 2001 – and only as a result of a lawsuit settlement. Current

management plans include allowing ORVs in the vast majority of the entire range of *P. andrewsi* (94% of creosote scrub and 84% of psammophytic scrub). Existing regulatory mechanisms are clearly inadequate to protect this Algodones Dunes endemic from extinction.

Despite BLM's failure to implement inventory monitoring requirements, sufficient data have been collected from BLM and FWS contractors, and a sufficient body of information on negative effects of ORVs on arthropods in the Algodones Dunes exists to indicate the species is imperiled. Petitioners appeal to FWS to immediately list the species as endangered under the ESA.

3. Overutilization for commercial, recreational, scientific or educational purposes.

No data are available.

4. Disease or predation.

Natural predation affects the population, but effects of disease on the Andrew's dune scarab beetle are unknown.

5. Other natural or manmade factors affecting its continued existence.

Pesticide use in the agricultural areas of the Imperial Valley is likely having negative impacts on the species through pesticide drift into the Dunes. Spraying programs for the curly top leafhopper virus are also likely directly impacting the species.

VIII. CRITICAL HABITAT DESIGNATION RECOMMENDED

Petitioners strongly recommend the designation of critical habitat for the Andrew's dune scarab beetle, *P. andrewsi*, coincident with its listing. Its tenuous status is clearly related to the historic and impending anthropogenic destruction of suitable habitat. Critical habitat should be designated in all areas where the beetle currently occurs and in key areas of suitable habitat where protection and restoration are necessary for the conservation of the species. The area proposed for critical habitat in 1978 would be the appropriate area to designate with the listing of the species.

CONCLUSION

In 1978, FWS concluded that ORV use at the Algodones Dunes threatened the continued existence of the Andrew's dune scarab beetle, *P. andrewsi*. Consequently, the agency proposed to list the species under the ESA. That proposed listing rule was never finalized. In the 24 years subsequent, ORV use at the Dunes has increased by an order of magnitude. The best known habitat for the species has been denuded of vegetation and likely rendered unsuitable for the species. All measures BLM committed to taking in the 1987 management plan for the protection of the species were ignored or unimplemented. Today, even though the threats to the species have significantly increased, BLM proposes to do even less. BLM's management plan for the Dunes will leave unprotected the vast majority of the species' known habitat. Until and unless BLM implements a management plan for the Dunes that adequately protects a significant portion of the Andrew's dune scarab beetle's habitat (>50%) the species qualifies for listing under the ESA. FWS must therefore take prompt action as required by law to process this petition and add the Andrew's dune scarab beetle to the list of threatened and endangered species.

Respectfully submitted,

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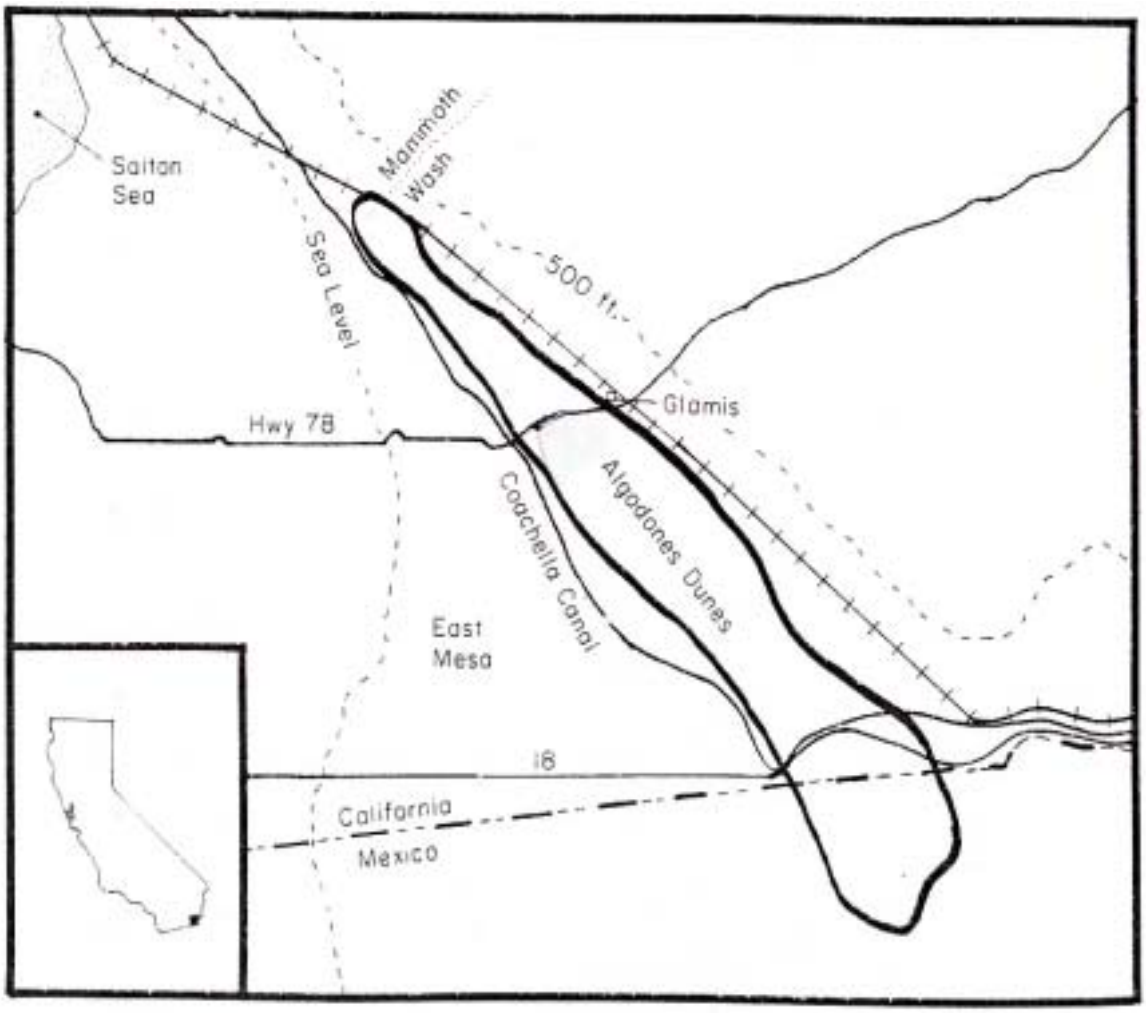

Figure 2. Algodones Dunes and vicinity, Imperial County, California and northern Mexico. From Luckenbach and Bury (1983).

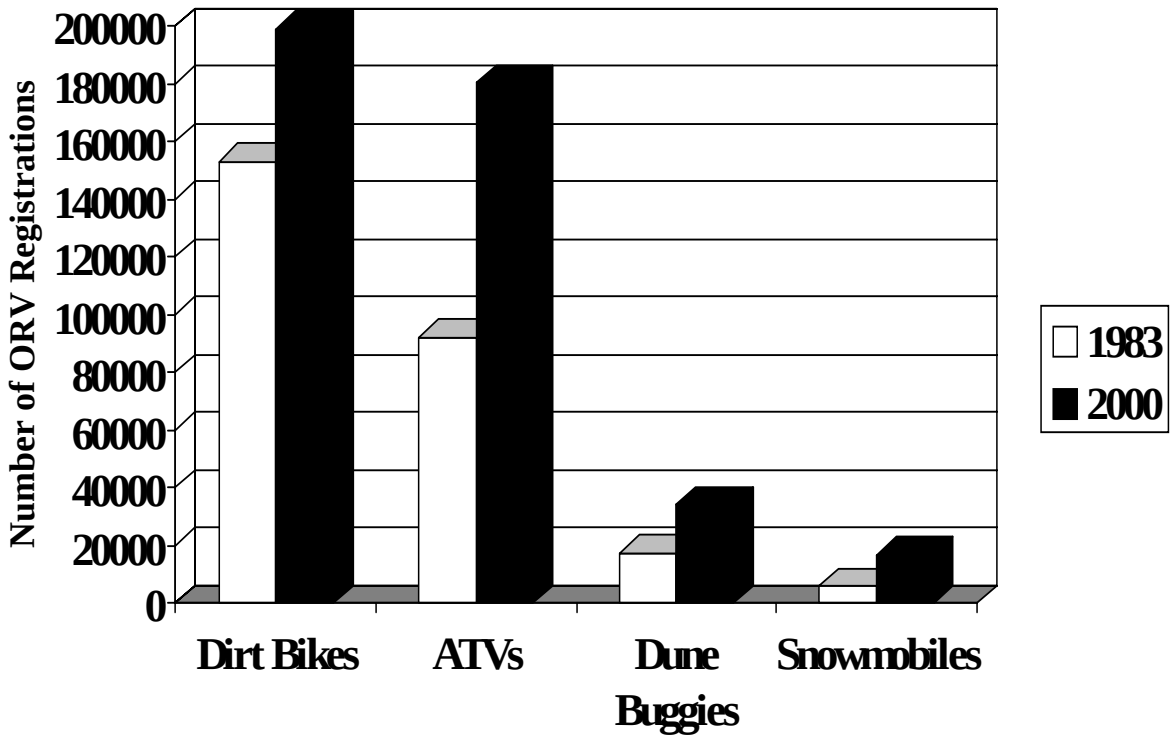

Figure 3. Increase in ORV registrations by vehicle type between 1983 and 2000 in California. From California State Parks (2002).

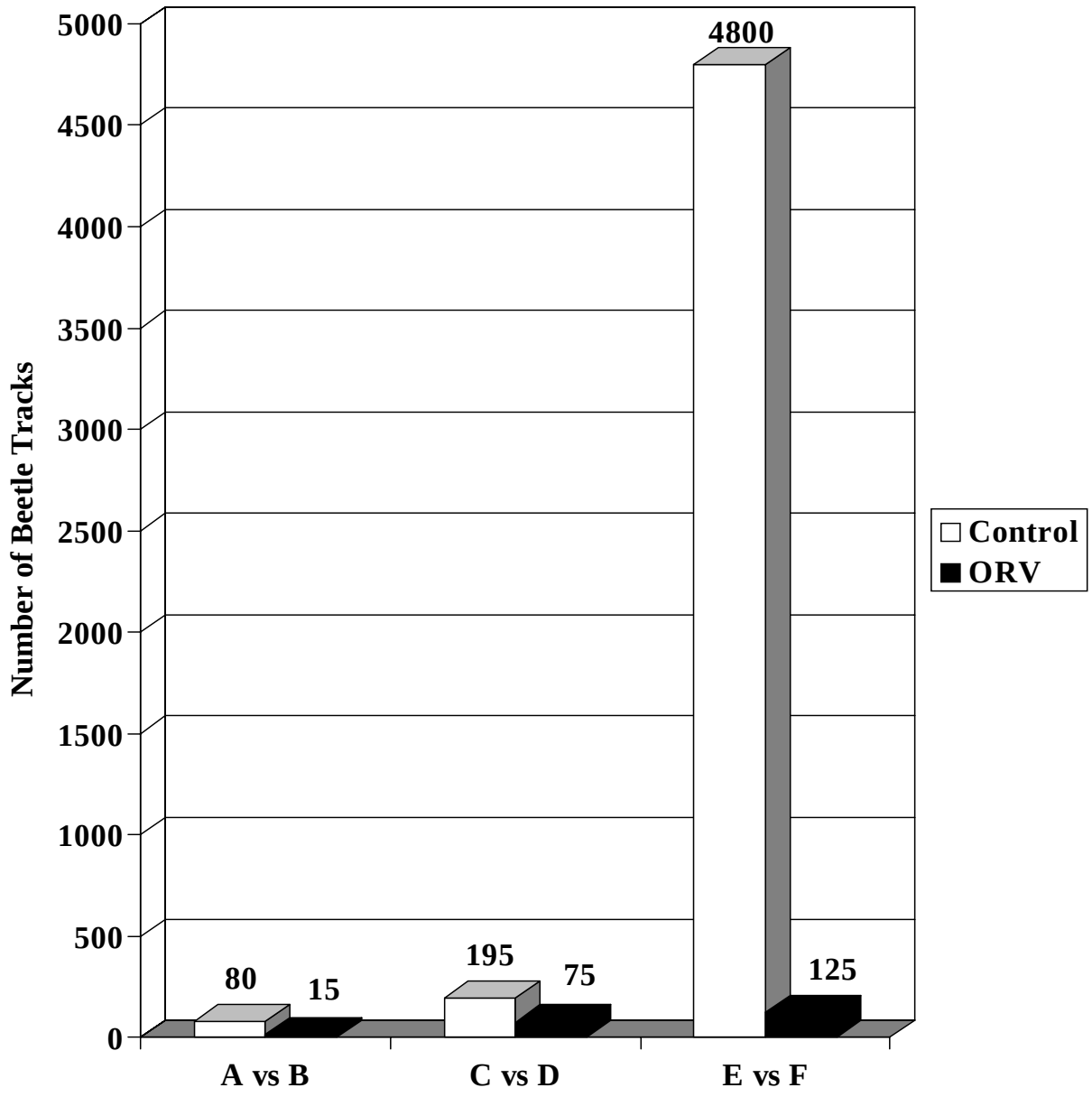

Figure 4. Comparison of beetle tracks between control and ORV-impacted areas recorded on 0.5 x 100 meter sand sweeps at the Algodones Dunes, 1977 and 1979. From Luckenback and Bury (1983).

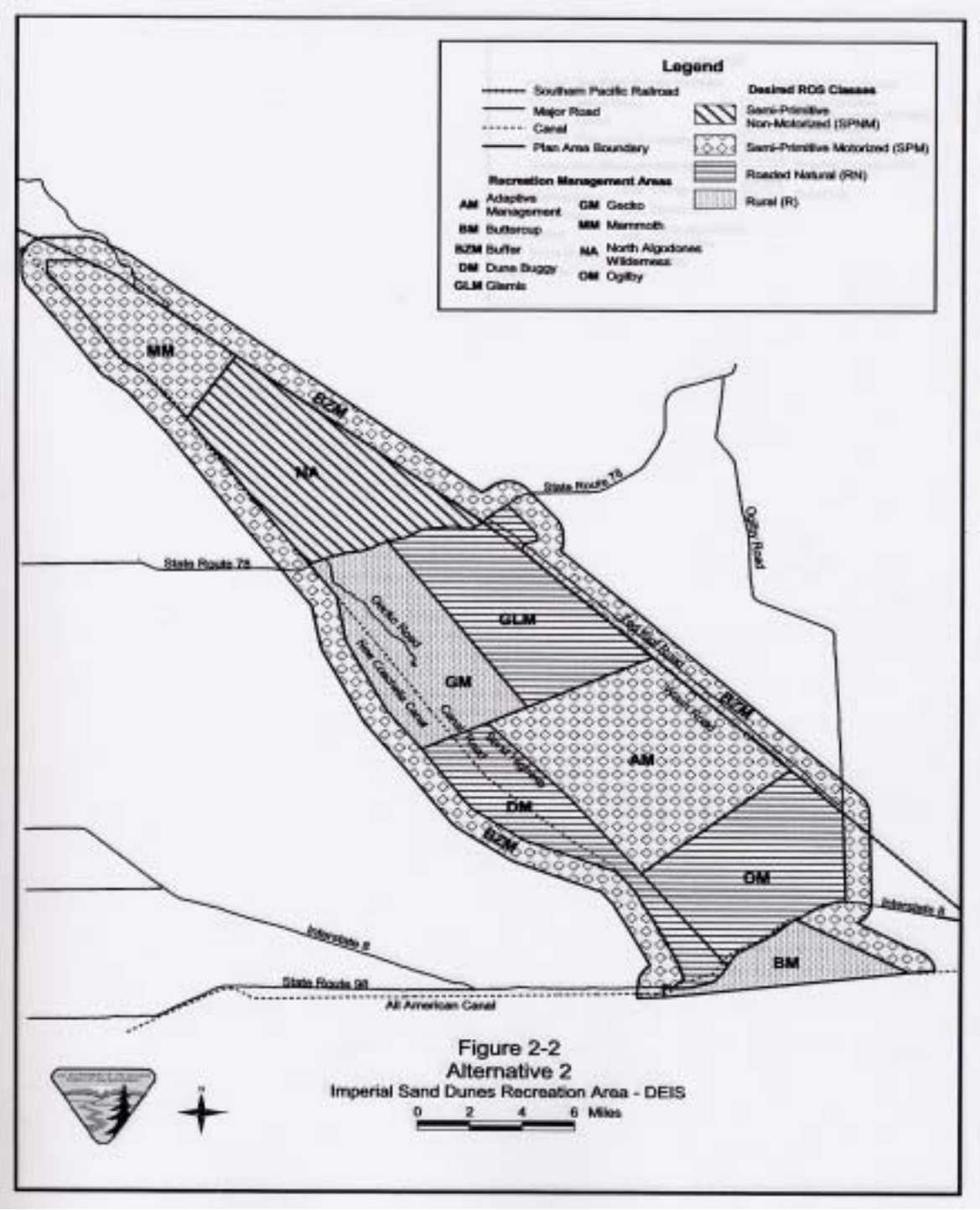

Figure 5. Recreation and Resource Protection Alternative 2, proposed land-use classes in the Algodones Dunes, Imperial County, California. Figure 2-2 in BLM (2002).

APPENDIX A

Comments by the petitioners on the BLM Draft Management Plan