BEFORE THE SECRETARY OF INTERIOR

PETITION TO LIST THE SAND MOUNTAIN BLUE BUTTERFLY (*Euphilotes pallescens arenamontana*) AS A THREATENED OR ENDANGERED SPECIES UNDER THE U.S. ENDANGERED SPECIES ACT

Submitted by,
Center for Biological Diversity
Xerces Society
Public Employees for Environmental Responsibility
Nevada Outdoor Recreation Association

April 23, 2004

Ms. Gale Norton
Secretary of the Interior
Office of the Secretary
Department of the Interior
18th and C Street N.W.
Washington D.C., 20240

Dear Ms. Norton:

The Center for Biological Diversity, Xerces Society, Public Employees for Environmental Responsibility and the Nevada Outdoor Recreation Association hereby formally petition to list the Sand Mountain blue butterfly (*Euphilotes pallescens arenamontana*) as a threatened or endangered species pursuant to the Endangered Species Act (hereafter referred to as ESA), 16 U.S.C. 1531 et seq. 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 Sand Mountain blue butterfly 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 Sand Mountain blue butterfly is restricted to the Sand Mountain Recreation Area in Nevada. Habitat for this species has suffered destruction and modification by extensive off-road vehicle (hereafter referred to as ORV) use over the past three decades. Current and proposed management of the species' habitat by the Bureau of Land Management (hereafter referred to as BLM) allows ORV use in the overwhelming majority of the areas known to harbor the species. Without the designation of as an Endangered Species, the Sand Mountain Blue butterfly faces an imminent threat to its continued existence in the wild.

The Sand Mountain Blue meets three criteria under the Endangered Species Act for consideration as an endangered species: 16 U.S.C. § 1533 (a)(1)(A,B,E) (Section 4).

(A) The present or threatened destruction, modification, or curtailment of its habitat or range.

(B) The inadequacy of existing regulatory mechanisms.

(E) Other natural or manmade factors affecting its continued existence.

Factors A), B), and E) play a significant role in endangering the continued existence of the Sand Mountain blue butterfly. The most immediate threat to this butterfly is the continued destruction of its hostplant, the Kearney Buckwheat by ORV use. Due to the threat of extinction and because of the Sand Mountain blue has a small population size, limited distribution, isolation, and the numerous factors threatening the species and its

remaining habitat, it is in immediate need of protection under the Endangered Species Act.

Because the Sand Mountain blue butterfly's habitat, and consequently the Sand Mountain blue itself, are confronted with an immediate and significant threat, we request an emergency listing and emergency critical habitat designation pursuant to 16 U.S.C. § 1533(b)(7) and 50 CFR 424.20.
Sincerely,

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The Center for Biological Diversity is a private non-profit public interest organization, whose mission is to protect and restore natural ecosystems and imperiled species in the western United States through science, policy, and law.

Nevada Outdoor Recreation Association (NORA) is dedicated to the preservation and management of our BLM Public Lands and unappropriated government lands worldwide. It is the nation's oldest BLM Public Lands environmental and commons ecology advocacy.

Public Employees for Environmental Responsibility (PEER) is a national non-profit alliance of local, state and federal scientists, law enforcement officers, land managers and other professionals dedicated to upholding environmental laws and values.

The Xerces Society is an international non-profit organization dedicated to protecting biological diversity through invertebrate conservation. The Society works with scientists, land managers, and citizens to protect invertebrates and their habitats by producing information materials, presenting educational activities, implementing conservation projects, and advocacy.

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        1) Continue to manage the Sand Mountain Recreation Area (SMRA) under the existing off-road vehicle designations.
        2) Develop programs and practices that encourage ORV users to prevent disturbance of Kearney Buckwheat habitat within and outside the SMRA.
        3) Begin efforts to restore and rehabilitate disturbed Kearney Buckwheat habitat within and outside the SMRA.
        4) Identify existing disturbed travel routes through the Kearney Buckwheat habitat to connect ORV use areas within and outside the SMRA. Discourage ORV use in the habitat area outside these travel routes.
        5) Continue scientific investigations into the Sand Mountain ecosystem, including studies of the natural history of the plants and animals, restoration techniques and monitoring technology.
        6) Initiate a revised management plan for the Sand Mountain landscape to update the current Recreation Area Management Plan, reflecting the increasing amount and variety of uses and demands of the area.
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I. EXECUTIVE SUMMARY

The Sand Mountain Blue butterfly (*Euphilotes pallescens arenamontana*) is a highly geographically restricted subspecies that only lives in Sand Mountain Recreation Area in the Great Basin of Nevada. Habitat for this species has suffered destruction and modification by extensive off-road vehicle (ORV) use over the past three decades. Current and proposed management of the species' habitat by the Bureau of Land Management allows ORV use in the overwhelming majority of the areas known to harbor the species. Off-road vehicles are an immediate threat to these butterflies and there are no regulatory mechanisms to protect them or their habitat. Without the designation as an Endangered Species, the Sand Mountain Blue butterfly faces an imminent threat to its continued existence in the wild.

II. INTRODUCTION

Sand Mountain is located in the 40-mile desert region of the Great Basin near Fallon, Nevada (Figure 1). It is one of approximately 45 isolated sand dune complexes in the Great Basin and Mojave Deserts. In the 1960's this dune was assumed to have only historic importance, being next to the Overland Stage and Pony Express Routes. However because the surrounding terrain prevents genetic interchange the dune actually resembles a habitat island, and harbors a great variety of species including the Sand Mountain blue butterfly (*Euphillotes pallescens arenamontana*) (Giuliani, 1977) According to Charles S. Watson, director of the Nevada Outdoor Recreation Association, the Sand Mountain dunes have generally remained undisturbed (i.e. relatively free from the influences of agriculture, mining, cattle, introduced weeds) by humans throughout our history. Thus, they still carry a diverse biota that has evolved on the mountain.

However, during the past three decades all this has changed. Sand Mountain's size, lack of adequate restrictions, and relative proximity to cities in both Nevada and California now make it a mecca for ORV enthusiasts (Giuliani, 1977). From 1993-2003 the Carson City Field Office has seen a 25% increase in visitor use at the recreation area, and BLM expects use to continue rising (BLM, 2003). This escalation in visitor ORV use has directly contributed to the decline of the Sand Mountain blue.

Figure 1: Sand Mountain, Great Basin Desert, Nevada.
The only known habitat for the Sand Mountain Blue.
Photo: Daniel R. Patterson

III. TAXONOMY

The Sand Mountain blue butterfly (*Euphilotes pallescens arenamontana*) is in the family *Lycaeninae*, the family that includes the blue, copper, gossamer-winged, hairstreak, and harvester butterflies, within the order *Lepidoptera* of the Kingdom *Animalia* and the Class *Insecta* (Austin, 2002). The taxon is named after its type locality and the only known place of its occurrence; *arenamontana* is derived from the Spanish words for Sand Mountain (arena= sand, montaña=mountain).

Order- Lepidoptera
- *Suborder- Macrolepidoptera*
  - Superfamily- *Papilionoidea*
    - Family- Lycaenidae
      - Genus- Euphilotes
        - Species- pallescens
          - Subspecies- *arenamontana*

IV. SPECIES DESCRIPTION

A. Adult

The adult Sand Mountain blue butterfly is small, with a wingspan of slightly less than one inch across when fully spread (Figure 2). Males of the species average 11.1 mm (10.0 - 11.8); females are slightly smaller at 10.9 mm (10.0 - 11.9). *E. p. arenamontana* is the palest sub-species of the *Euphilotes* genus. The distally whitish dorsum and pinkish aurora are also distinct traits in the subspecies. *E. p. arenamontana* differs from *E. p. pallescens* by the non-contrasting wing bases at the distal areas. The ventral surfaces of the two subspecies are said to be similar but the black macules on *E. p. arenamontana* are usually smaller (Austin, 1998).

B. Male

The males' have a pale bluish violet dorsum that is nearly whitish towards the distal edges. The outer margin of the wing is narrow (0.5 mm) and black, sometimes no more than a terminal line on the forewing and a series of black dots on the hindwing. The fringes are white with gray checkering behind the vein tips on both wings. The ventral surface is chalky white; the macules are small, and nearly obsolete on the hindwing. The moderately wide aurora on the hindwing is pale orange (Austin, 1998).

C. Female

The females' dorsum is brown to tan and only similar to the males' bluish coloring at the bases on both wings. The forewing possesses a brown cell-end bar, and the apex is typically whitish. The hindwing has black dots along the margin, and the aurora on the hindwing is pale orange to pale pink, usually becoming nearly white distally and not strongly contrasting. The fringes and the ventral surface are the same as found on the males of the subspecies (Austin, 1998).

D. Immature

The larvae of the Sand Mountain blue butterfly are fat and grub-like, with lateral setae. Like other blue butterflies, the Sand Mountain blue larvae are very colorful (Funari, personal communication).

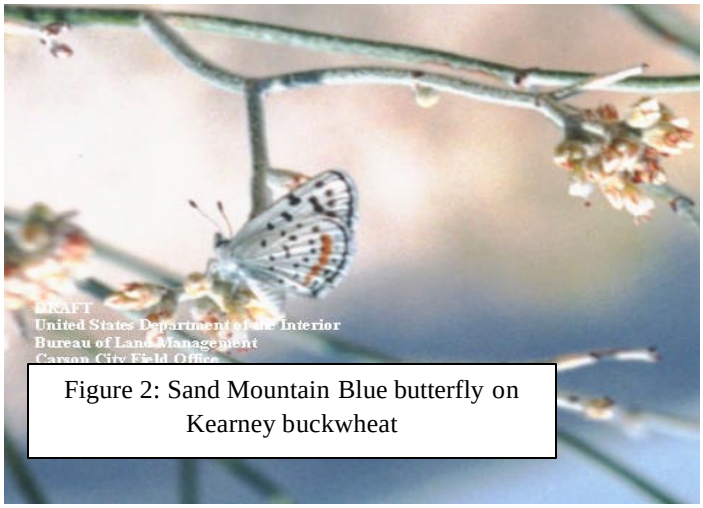

Figure 2: Sand Mountain Blue butterfly on Kearney buckwheat

V. LIFE HISTORY

A. Habitat

Sand Mountain blue butterflies are closely linked to their larval host plant, Kearney buckwheat, also known as Money Buckwheat, (*Eriogonum nummulare* M.E. Jones), throughout their life (Austin, 1998). In this area of Nevada this plant grows primarily near the southern dunes on Sand Mountain. This plant is the sole food source for the larvae and an important nectar source for adults during their flight period (Opler, 1999). The plant also provides cover and a layer of litter on the ground where pupae mature. Emergence generally coincides with the peak flowering of the host plant and occurs between mid-July and mid-September. The Sand Mountain blue butterfly only lives about one week as an adult and the overall population of adults is active for only a few weeks.

The Sand Mountain blue is only known to exist at Sand Mountain. Its absence in other dunes nearby, such as Blow Sand Mountain, suggest that this butterfly requires a large area of the Buckwheat.

B. Life Cycle

The subspecies produces one brood a year and the maturation of larvae is timed in accordance with the peak blooming of its host plant, Kearney buckwheat (Austin, 1998). The female butterfly lays single eggs into buckwheat flower heads within 24 hours of mating. In about a week the egg hatches and becomes a larva. The larvae feed on petals and fruit in the flower head.

The larvae are also known to produce a secretion of sugar from the abdominal glands that provides food for their attendant ant species, the desert carpenter ants. In return, the

larvae are thought to derive some protection from predation or parasitism from the ants, but this remains uncertain (Funari, personal communication). The larvae mature through several larval stages called instars in three to four weeks before becoming a pupa. The pupa eventually falls into leaf litter and topsoil beneath the plant. Pupae diapause for the winter (Austin, 1998).

This species is non-migratory and movement has been observed to be restricted to within 200 feet of the host plant (Opler, 1995).

C. Host plant

Kearney buckwheat is a long-lived perennial shrub with an extensive branching caudex deriving from a woody taproot (Figure 3). The caudex adjusts to the shifting dune sand and the flexible aboveground branches can occasionally be found downslope from the taproot (Reveal, 2002). Kearney buckwheat has deep roots and an ability to survive sand movement. These plants often form hummocks, mounds of sand held in place by roots and stems, which are important stabilizers of blowing sand (Bury and Luckenbach, 1983). Leaves are formed in the spring and early summer and when exposed, the caudex also becomes photosynthetic. Flowering begins in early summer and continues until a killing frost; fruit production is likewise continuous. Kearney buckwheat is widespread in Nevada, occurring along the western third of the Great Basin desert and in a total of eight Nevada counties, from 3700-6100 ft. in elevation (Reveal, 2002). It is not considered threatened, rare, or at risk in Nevada (NNHP, 2003). Kearney buckwheat also occurs in Utah, Arizona, and California (USDA, 2003). Natural causes of mortality include foraging chipmunks and droughts; however the mature Kearney has such an extensive root system that drought will only have a considerable impact on germinating plants. The most destructive unnatural cause of mortality in the San Mountain area comes from ORV impact.

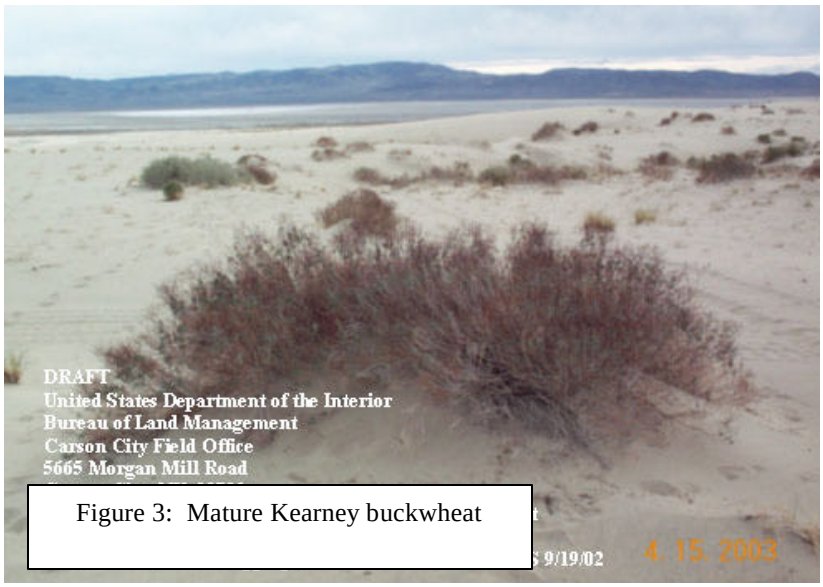

Figure 3: Mature Kearney buckwheat

VI. Sand Mountain Recreation Area

Sand Mountain Recreation Area (SMRA) consists of 4,795 acres. The dunes are about one mile wide and 3.5 miles long. About 10,000 years ago, glaciers filled many of the valleys in the Sierra Nevada Mountains to the west. The cool, wet climate and runoff from these glaciers had created an immense inland lake that covered much of what is now western Nevada. However, as the climate grew warmer the glaciers retreated and the lake slowly started to dry up until eventually the lake level dropped below where Sand Mountain now stands. Meanwhile quartz particles, which the glaciers had ground away from the hard Sierra granite, were washed down the Walker River and deposited in the river's delta. As the wind blew across the delta this sand was picked up and carried high into the air. More than thirty miles to the northeast, a large basin on the southwest flank of the Stillwater Range slowed the wind. With its force broken by the mountain, the wind's burden of sand would fall into this natural trap (BLM, 2004). Over the centuries Sand Mountain grew to its present height; its highest point rises approximately 600 feet above the valley floor, making it the largest single dune in the Great Basin area. The primary reason people go to the SMRA is to ride their ORVs on the dunes; however there is also the historic Sand Springs Pony Express Station and Desert Study Area to visit.

The less active, smaller dunes on the periphery of the main dune system are particularly important habitat for the Kearney Buckwheat and likewise the Sand Mountain Blue butterfly (The Nature Conservancy of Nevada, 2002). This area is typical of the Great Basin cold desert with an average rainfall of 13cm/year. The summers (May-September) are hot and dry with an average temperature of 18.8 C, and the winters (October-April) are cold and dry with an average temperature of 5.3 C.

Sixteen species endemic to Sand Mountain have been identified and others provide important habitat for these species. Important species on Sand Mountain include the mottled milkvetch (*Astragalus lentiginosus var. kennedyi*), Kearney buckwheat (*Eriogonum nummulare*), desert sunflower (*Helianthus deserticola*), sand cholla (*Opuntia pulchella*), Nevada oryctes (*Oryctes nevadensis*), Sand Mountain blue butterfly (*Euphilotes pallescens arenamontana*), Hardy's aegialian beetle (*Aegialia hardyi*), Sand Mountain aphodius scarab beetle (*Aphodius sp*.), click beetle (*Cardiophorus sp*.), Sand Mountain pygmy beetle (*Coenonycha pygmaea*), sand-obligate beetle (*Eusattus muricatus*), Sand Mountain serican scarab beetle (*Serica psammobunus*), dune honey ant (*Myrmecocystus arenarius*). Numerous species of rare and endemic bees are also found at Sand Mountain: *Anthidium rodecki, Anthophora affabilis, Calliopsis phaceliae, Colletes stepheni, C. tectiventris, Hespereapis sp., Perdita aridella, P. chloris, P. cleomellae, P. eucnides eucnides, P. haigi, P. hirticeps apicata, and P. vesca* (The Nature Conservancy of Nevada, 2003).

VII. POPULATION DISTRIBUTION OF THE SAND MOUNTAIN BLUE

The only known habitat for the Sand Mountain blue butterfly is on the Sand Mountain dunes within the Sand Mountain Recreation Area, Bureau of Land Management,

Churchill County, Nevada. All type specimens were collected from this locality (U.S. highway 50, Sand Mountain, 1310 m, T17N R32E S28 on USGS Fourmile Flat, Nev. 7.5' quadrangle) (Austin, 1998).

VIII. POPULATION STATUS OF THE SAND MOUNTAIN BLUE

The Sand Mountain blue butterfly (*euphilotes pallescens arenamontana*) is a BLM sensitive species that is endemic to Sand Mountain. The Sand Mountain blue was previously listed as G4T1; however it has recently been classified as G3G4T1. The G3G4 rank indicates that the species as a whole is vulnerable. The T1 distinction denotes that it is a critically imperiled subspecies at great risk of extinction (The Nature Conservancy of Nevada, 2003).

Given their restricted geographic ranges, endemic species are generally considered more prone to extinction than widespread species, particularly short-lived species that can decline rapidly if their reproductive cycle is disrupted (Rabinowitz, 1981). According to Dean Tonenna this endemic invertebrate species is dependent on the 1000 acres of Kearney buckwheat habitat. Within the San Mountain Recreation Area this plant was once pervasive in the vicinity of the dunes but in the past five years most plants on the southeast side have been destroyed by ORV activity (personal communication). With its small population and limited range and with habitat destruction from ORVs, the future of this subspecies is precarious.

A. Distribution of the Kearney Buckwheat

The Kearney buckwheat (*eriogonum mummulare*) is the only larval host species for the Sand Mountain blue butterfly. The Kearney Buckwheat occurs at the southeast and northern boundaries of the Sand Mountain dune (University of Nevada Biological Resources Research Center, 2000) (Figure 4).

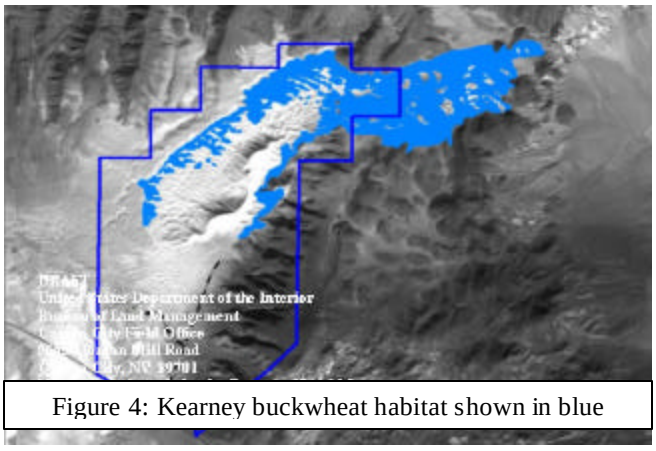

Figure 4: Kearney buckwheat habitat shown in blue

Extensive reconnaissance trips have been conducted by the BLM in order to find if a large enough population of Kearney buckwheat exists outside of Sand Mountain to support a population of the Sand Mountain Blue butterfly (SMBB). On January 27, 2003, Claudia Funari (BLM wildlife biologist), Dean Tonenna (BLM Plant Ecologist),

Jody Fraser (USFWS Botanist), Marcie Hayworth (USFWS Wildlife Biologist), Rochanne Downs (Fallon Paiute-Shoshone Tribe representative), and Tansey Smith (FPST Environmental Specialist) conducted a reconnaissance trip to determine if within a 100-kilometer radius of Sand Mountain, there existed a population of Kearney Buckwheat that would be able to sustain a population of Sand Mountain Blue butterflies. The group surveyed six sites along a long linear stretch of sand dunes found west of the Stillwater Range. Kearney buckwheat was not observed at any of the six sites surveyed and the group concluded that the plant was probably not present within the dune complex. They concluded if it was present the population is so small as to be unsuitable habitat for sustaining the SMBB (Funari, personal communication).

On August 17, 2003, Funari, Tonenna, Fraser, and Hayworth along with Gary Ryan (BLM Navy Liason), Dr. Dennis Murphy (Professor at University of Nevada), Dr. George Austin (Nevada State Museum Zoologist), Sue Wainscott (Nature Conservancy), Jan Nachlinger (Nature Conservancy), two U.S. Navy Biologists, and four U.S. Navy personnel conducted a reconnaissance trip to Blow Sand Mountain. Blow Sand Mountain is a small, dry range south of Carson Lake, with most of the southern portion of the range dominated by large sand dunes. Kearney buckwheat was not observed, and it was concluded by the group that if any Kearney buckwheat was present and missed within the area surveyed, that it would not be a large enough population to sustain the SMBB. These reconnaissance expeditions confirm that there is not a large enough population of Kearney buckwheat close enough to Sand Mountain to support a viable Sand Mountain Blue butterfly population. Based on this survey information it can be safely assumed that there is no other habitat within the flight range of Sand Mountain Blue except what is found at Sand Mountain (Funari, personal communication).

IX. CRITERIA UNDER THE ESA FOR CONSIDERATION AS AN ENDANGERED SPECIES

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Sand Mountain is sacred to the Fallon Paiute-Shonshone Tribe and has been used for centuries by the spiritual people of Great Basin Tribes. However since the invention of off-road vehicles, Sand Mountain has seen a drastic change in the number of visitors and their recreational use of the land (BLM, 1985). Motorized recreation today accounts for over 90% of the total visits to the area. From 1993-2003 the Carson City Field Office has seen a 25% increase in visitor use at the recreation area, and BLM expects use to continue rising (BLM, 2003). Visitor use at SMRA has increased dramatically over the past five years with approximately 5,000 people present during the Memorial Day holiday in 2003 (BLM, 2003). The increase in yearly visitors to the area has contributed to an increase in the number of ORV trails through the Sand Mountain Blue habitat (Figures 5, 6, 7, 8 and 9). ORVs at the Sand Mountain Dunes include dune buggies, sand rails, and off-road motorcycles, whose tires can cut deeply into the sand even when accelerating on level ground (Stebbins, 1995).

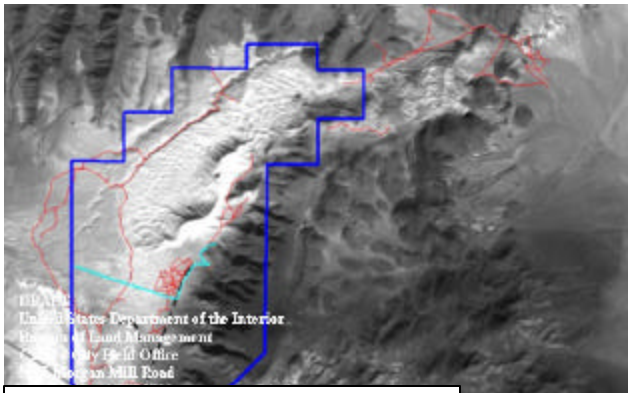

Figure 5: Trails in 1978 in red

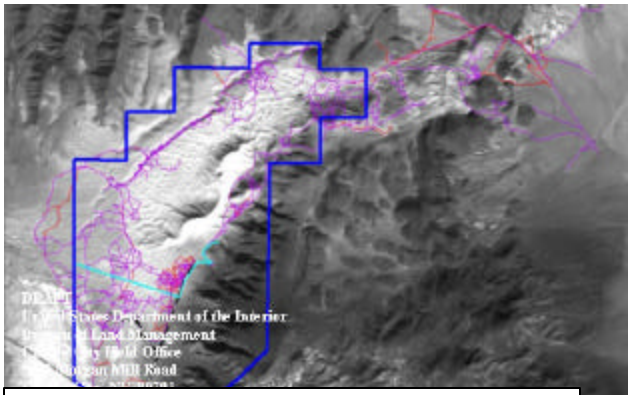

Figure 6: New trails from 1979-1994 in purple

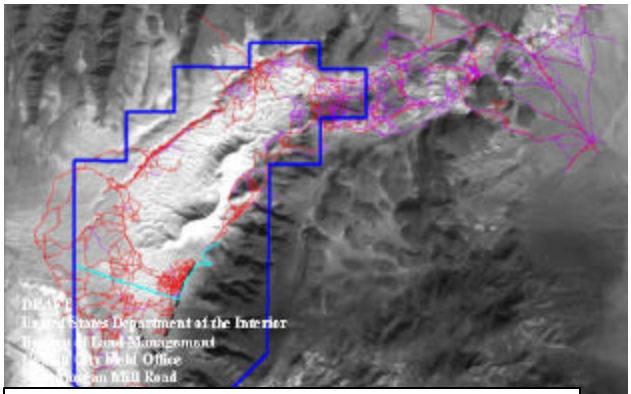

Figure 7: Trails from 1978-1994 in red, new trails from 1995-1999 in purple

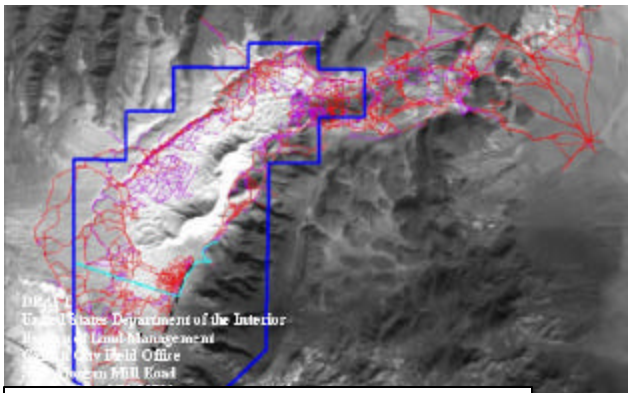

Figure 8: Trails from 1978-1999 in red, trails from 2000-2002 in purple

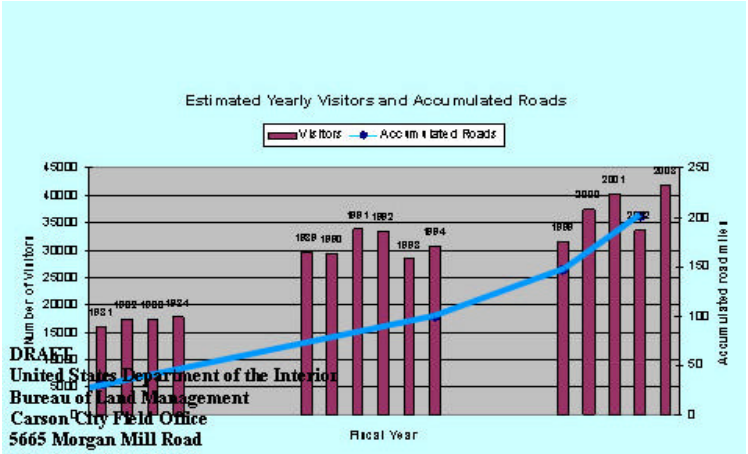

Figure 9: Estimated yearly visitors & accumulated roads.

During a visit to Sand Mountain in 1977, Derham Giuliani, an expert in the field of invertebrates of the Great Basin, discovered that along the edge of the main rise of the dune for a distance of 1000 ft. the plant life had been wiped out to at least 150 ft. from the dune, and only low humps of dead roots and stems remain. Not a single insect track was

present for at least 100 ft. David L. Harlow, former USFWS State Supervisor of Ecological Services in Reno, found that of the 58 individual Kearney buckwheat plants he inspected on the south side of the mountain up to one-half had been disturbed (crushed and broken off at the ground surface) and were either dead or in the process of resprouting from the root stocks. He also noted that this was a fifty to seventy-five percent increase from five years ago (1994). In 1996 Dr. Peter Brussard, Head of UNR Dept. of Biology and co-chair of NV Biodiversity Initiative, emphasized that if the food plant for the Sand Mountain blue, the Kearney Buckwheat, continues to decline in the overall dune area, the butterfly's continued existence will fall into question. As of 2000, the Kearney Buckwheat had been nearly eliminated on the lower, southeast footing of the dune near the vehicle staging area (University of Nevada Biological Resources Research Center, 2000) (Figure 10).

Figure 10: Intensive ORV use in the SMRA causes complete vegetation loss and habitat destruction. *DRP photo.*

The Nature Conservancy of Nevada conducted a conservation assessment of Sand Mountain in 2002 with input from published literature, interviews with experts in sand dune ecology and management, local public land managers, and scientists. The assessment gave Sand Mountain a fair condition rank because they determined that the condition of the dunes was heavily impaired due to loss of vegetative cover from recreational use and abuse. They found that in particular, the practice of running vehicles over large perennial plants at high speeds is a significant source of stress to the Sand Mountain dune system (The Nature Conservancy of Nevada, 2002). Abuses by ORVs include off-trail incursions into previously undisturbed vegetated areas and destruction of vegetation. ORV abuse also artificially increases dune activity and soil erosion by destroying the natural vegetation cover and biological soil crusts. Photo documentation captures the extent of the habitat destruction (Figures 11-14). The conservation assessment concluded that the critical threat to viability of Sand Mountain and its unique suite of plants and invertebrates is degradation of the vegetated dunes from ORVs (The Nature Conservancy of Nevada, 2003).

Figure 11: Beginning of a noticeable reduction in vegetation

Figure 12: Left side of the road closed to vehicles, loss of vegetation evident on right side

Figure 13: Continued damage to vegetation

Figure 14: Vegetation has been entirely destroyed over a period of only 26 years

The Kearney buckwheat shrubs collect sand and in time form small mounds. ORV enthusiasts use the shrub mounds as “jumps”. With repeated use as a “jump” the shrub dies and the sand-stabilizing properties of the plant are lost. (Figures 15, 16)

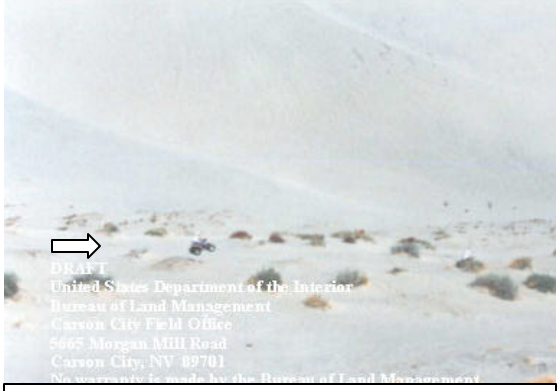

Figure 15: Example of ORV using a shrub mound as a “jump”

Figure 16: Example of a dead shrub from repeated use as a “jump”

ORVs also alter ecosystem function by changing the hydrology of the dunes. Plants are dependent on the thin layer of topsoil; when the surface is disturbed, the underlying soil

can blow or wash away. The result is a barren area that is unable to support plants until new soil develops, which can take thousands of years (Kockelman, 1983). In addition, clay layers found below the sand act as impermeable barriers to downward percolation of precipitation. This likely has the effect of keeping soil moisture closer to the roots of the plants. Without the soil stabilizing properties of the vegetation, the wind transports the sand, revealing the clay layer. With further vehicle impacts the clay layer is broken and punctured, resulting in precipitation percolating down to deeper depths. This may create a difficult situation for plants trying to reestablish these sites when the soil moisture is now deeper in the sand (Tonenna, personal communication). Not only are plants damaged, but also the interspaces between the shrubs are constantly disrupted making it exceedingly difficult, if not impossible, for seedlings to germinate in unoccupied open spaces between the shrubs. This could be the primary reason that Kearney buckwheat populations are skewed toward older-aged classes (Figure 17). Tonenna emphasizes that without adequate younger shrubs, there is the real threat of invertebrate population crashes/extinctions when the majority of the older plants die naturally or die from vehicle impacts (personal communication).

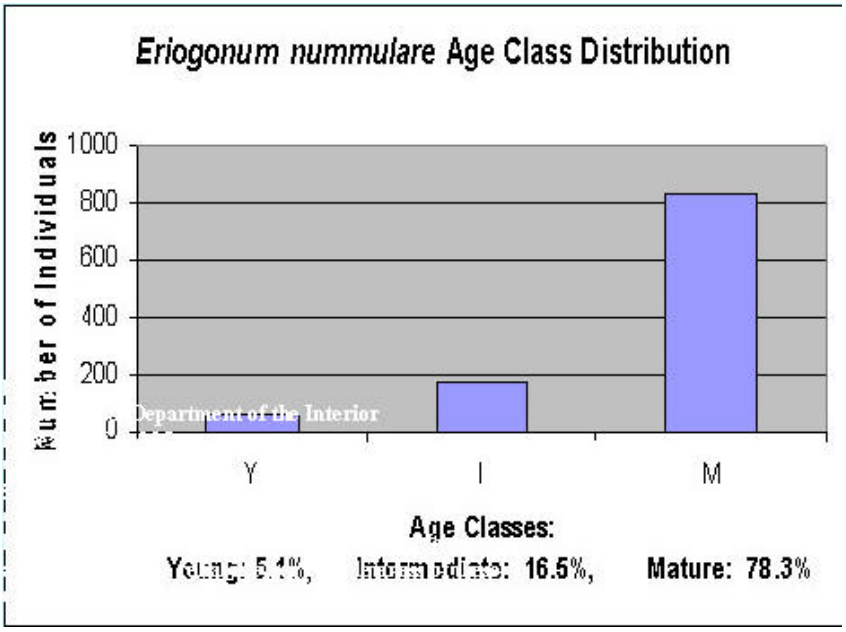

Figure 17: The host plant population is skewed towards older-aged classes, illustrating low survival of young plants essential for future habitat.

Several published studies have documented the deleterious effects of ORVs on insects and vegetation. For example, vehicles have crushed the larval burrows of the tiger beetle, *Cicindela dorsalis*, along beaches to such an extent that this once widespread, abundant species has been eliminated throughout most of its range (Black and Vaughan 2003). Bury and Luckenbach studied the affects of ORV use in the Algodones Dunes in California. They compared areas that were not impacted by ORVs to those that had been affected by ORV activity, and found that ORVs significantly reduced the biota. The areas not impacted by ORVs had 2.5 times the number of plant species, 10 times the

density, 10 times the cover, and 4 times the number of shrubby perennials, as did the ORV affected plots. It was found that in those areas where ORV users congregate, shrub biomass was reduced by about 95% as compared to undisturbed areas. They conclude that ORVs have had an obvious, harmful affect on dune plant communities (1983).

Vegetation recovery has also been quantitatively measured in sevral land sites. Lathrop found that only 35% of the vegetative cover returned on vehicle trails after 38 years and only 18% of the vegetation recovered on heavily used roads (1983). Rowlands studied the effects of controlled ORV use in three areas in the Mojave Desert and concluded that "recovery from compaction is long term" and "several centuries may be too conservative for recovery time" (Webb and Wilshire, 1983).

Due to mild weather conditions year-round at Sand Mountain, the dunes receive significant ORV throughout the year. Therefore there is not a considerable 'rest' period from ORV use in the SMRA, even during the summer when the butterfly is active. In addition to the crushing of foliage, root systems and germinating seeds are damaged during compaction of the soil; the superstructure of the vehicles also damages the plants, over the entire area of the vehicle and not just the track width (Lathrop and Rowlands, 1983). The data indicate that perennial vegetation and ORV use are incompatible, and so we must choose to have either one or the other (Lathrop, 1983). As you can see in the photos below, large rocks are often the only reason that some habitat is not degraded (Figures 18, 19 and 20).

Figure 18: Large rocks are avoided by ORVs and therefore protect the Kearney from being trampled; note loss of habitat outside of the rocks. *DRP photo.*

Figure 19: Rocks keep ORVs off left.

Figure 20: Same site showing the extent of the trails on the right slope

B. The Inadequacy Of Existing Regulatory Mechanisms

There are currently no federal, state or local regulations that protect the Sand Mountain Blue butterfly or its habitat.

Over the past 25 years the BLM has failed to protect this area from excessive ORV use. In1977, the BLM's environmental assessment record stated that continued ORV activity would contribute to the already deteriorated vegetation. A 1978 study by the BLM explains that the use of the area by off-road vehicles has caused vegetation to be removed and/or caused a shift from perennial grass and shrub species to annual plants species. Yet despite these findings the Sand Mountain Recreation Management Plan does not adequately take into account biological considerations (Hardy, 1978).

In 1990 George Austin, zoologist with the Nevada State Museum, informed authorities that the Sand Mountain Blue butterfly is threatened by disturbance of its host plant from trampling by vehicles (Federal Register, 1992). On May 9, 1994, members of the Nevada State Office, the BLM, the Nevada Natural Heritage Program, and the Nevada State Museum, participated in an on-site visit to the area. At that time, as far as any of the participants knew the butterfly had only been found in one, eight-acre patch of Kearney buckwheat near the parking area. The group came to a consensus that the Sand Mountain blue's habitat has, and will continue to be seriously degraded unless measures are taken to protect the Sand Mountain Blue and concluded that they have never seen a better case for emergency listing. On August 1, of that year, additional Kearney buckwheat habitat with the Sand Mountain Blue butterfly was located in the SMRA. The BLM decided that they were no longer dealing with an emergency situation and decided to put in place a monitoring plan in order to avoid a similar situation in the future (BLM, 1995). BLM's Jim Ramakka and USFWS's Janet Bair teamed up to map the Kearney's distribution using both photo points and GPS. However Ramakka and Bair left their positions in 1996 and both agencies abandoned the monitoring project until USFWS's Jody Fraser took it up again in 1999; unfortunately during these three years the Kearney buckwheat habitat suffered severe, irrevocable damage from ORVs. This is just another example of BLM failing to follow through on conservation measures (Tonenna, personal communication).

Despite existing roads, vehicles leave the roads and run right through the sensitive species habitat (Figure 21). Although the Desert Study Area is a site for passive recreation, ORVs illegally enter the limited and closed area on a continued basis (BLM, 2003).

Figure 21: Too many off-roaders ignore signs and ride in closed areas near Sand Mtn. None of the blue's habitat is now closed to ORVs.

In the spring of 2002 BLM staff recommended closing off some areas at Sand Mountain to off-roaders to protect the Sand Mountain blue butterfly, the Kearny buckwheat, and several other rare endemic species. BLM convened a subgroup of BLM staff, U.S. Fish and Wildlife Service (hereafter FWS) staff, conservationists, off-roaders and a representative of the Fallon-Paiute Shoshone Tribe to discuss the recommendation. BLM proposed a compromise that focused on protection of the 1000 acre habitat area along the mountains edge, while keeping the more popular off-road riding areas on the dunes open-despite severe environmental damage there. However, off-road industry groups were unwilling to consider any closure, demanding the entire SMRA be open to intensive off-roading. So although members of BLM and FWS supported the closure, they succumbed to pressure from the ORV industry and agreed not to close any habitat, at the expense of several species. Charles S. Watson, director of the Carson City-based Nevada Outdoor Recreation Association, asserts that "BLM has shamefully allowed Sand Mountain to be taken over by destructive off-roading, and now they make a political decision to avoid upsetting the industry that will allow continued harm to endemic species and cultural sites" (personal communication).

In July 2003, the BLM claimed that they were taking "emergency action" to protect and restore the sand dune ecosystem at SMRA, while allowing ORV activity to continue in all habitat areas (BLM, 2003). The plan highlighted six main actions related to ORV use and abuse yet none of these strategies are adequate to protect the Sand Mountain Blue and its habitat.

1) <u>Continue to manage the SMRA under the existing off-road vehicle designations.</u>

The BLM continues to allow unrestricted and intensive ORV use across the entire SMRA, which is causing further habitat destruction.

2) <u>Develop programs and practices that encourage ORV users to prevent disturbance of Kearney Buckwheat habitat within and outside the SMRA.</u>

This is a purely voluntary approach, which has not worked in the past and is not working now. It includes posting signs such as, "stay on the sand and away from vegetation". However as was noted earlier, many ORV riders use the Kearney mounds as "jumps", and so would prefer to stay on the vegetation. Other signs even ask the ORV rider to "tread lightly"; a very difficult thing to do on a 250-500 lb. motor vehicle. Therefore, instead of putting in place enforceable measures to preserve the remaining Kearney habitat, the BLM introduced voluntary measures that are unenforceable and *do not protect the Sand Mountain Blue butterfly from ORVs.* "The law (Executive Orders 11644 and 11989, 53 CFR 31003 subsections 8341.2 and 8342) and policy (BLM Manuel 6840)) requires land managers to close areas to off-road vehicles where clear damage to natural resources is occurring, as it is at Sand Mountain. It does not allow managers to avoid needed closures with voluntary approaches", said Karen Schambach of Public Employees for Environmental Responsibility. "When asked, BLM could not identify anywhere where voluntary off-road vehicle restrictions have worked to conserve or restore habitat" (personal communication).

It is important to note that when considering whether or not to list a species, the Fish and Wildlife Service is not to consider promised or future management actions, but instead only the current management and status of the species. In numerous cases, the Fish and Wildlife Service has been forced by judicial action to reverse decisions not to list species because they relied on promised management actions, including decisions over the Barton Spring's salamander, Queen Charlotte goshawk, jaguar, Alexander Archipelago wolf and coho salmon. This is not merely a legalistic technicality. There is good reason for considering only current management and status. States, Federal agencies and private interests can easily promise to protect and recover species in order to avoid or delay a listing that they consider potentially controversial, but there is no way of knowing whether they will follow through on their promises or whether their actions will result in recovery. To protect species from ongoing destruction, modification or curtailment of habitat or range, listing under the ESA is required, while management actions are being tested. If it turns out promised management actions result in substantial recovery, then at that point they can be incorporated into a recovery plan for the species. Clearly, the Sand Mountain Blue butterfly is experiencing ongoing habitat destruction throughout the SMRA that is placing it in danger of extinction and thus requires ESA protection, regardless of untested and promised management actions.

3) <u>Begin efforts to restore and rehabilitate disturbed Kearney Buckwheat habitat within and outside the SMRA.</u>

Restoring and rehabilitating the Kearney buckwheat is a laudable goal and will be important in the long-term survival of this butterfly. It is a good step but it does not provide regulatory protection for the butterfly. This unenforceable plan is vague and lacks detail on where, when and how habitat restoration would be attempted. Furthermore, if BLM continues to allow ORV use in habitat areas, restoration attempts are unlikely to be successful.

4) <u>Identify existing disturbed travel routes through the Kearney Buckwheat habitat to connect ORV use areas within and outside the SMRA. Discourage ORV use in the habitat outside these travel routes.</u>

The goal of this is to sacrifice areas to high use ORV traffic with the goal of protecting other areas (Figure 22). Even if there was enough habitat remaining for this to work the BLM is not putting in place any enforceable measures that can protect the healthy Kearney from damage. This will provide no regulatory protection for the butterfly.

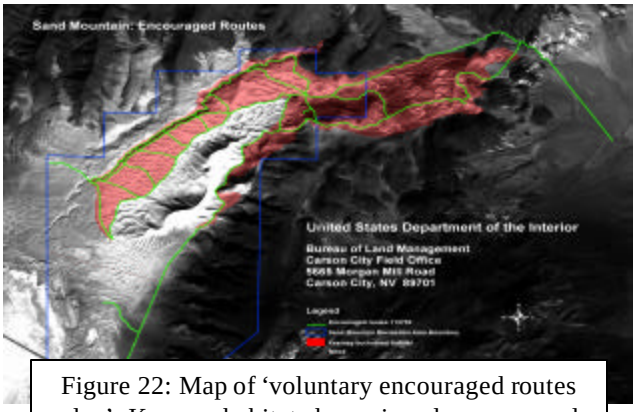

Figure 22: Map of 'voluntary encouraged routes plan', Kearney habitat shown in red, encouraged routes shown in green. This voluntary plan is not working.

5) Continue scientific investigations into the Sand Mountain ecosystem, including studies of the natural history of the plants and animals, restoration techniques, and monitoring technology.

This is a very important and necessary step in the long-term survival of the Sand Mountain Blue Butterfly. However with no regulations protecting habitat for the butterflies, scientific studies will do little good.

6) Initiate a revised management plan for the Sand Mountain landscape to update the current Recreation Area Management Plan, reflecting the increasing amount and variety of uses and demands of the area.

Any management plan that solely relies on voluntary and unenforceable measures will not be able to provide substantial protection to the Sand Mountain Blue butterfly.

The BLM has been conducting weekly monitoring of the routes to determine how well voluntary compliance is working, and have come to a consensus that it is not protecting the Kearney Buckwheat. In his 2004 ACEC (Area of Critical Environmental Concern) proposal BLM's Dean Tonenna asserts:

> Presently, 15 weeks of data have been compiled. The results show that noncompliance is occurring throughout the area. All routes through the habitat continue to be used, with the greatest concentration of use in the wash just west of the main dune. Impacts to the shrub vegetation continue with multiple vehicles riding through the vegetation despite nearby existing routes. Educational efforts and increased signage are routinely ignored as vehicles leave the routes, often running over the posted signs. While there does seem to be some level of compliance as a result of the management changes, there is still significant noncompliance that will likely continue the trend of vegetation loss and prevent the rehabilitation of the area (personal communication).

Therefore the implementation of programs using voluntary measures has been for the most part futile. This shows that the ORV riders at Sand Mountain are either still unaware that by riding in the restricted areas they are bringing a butterfly close to extinction, or else they just don't care. Yet either way the existing measures are not regulatory and undoubtedly ineffective, and unless more successful regulatory procedures are put in place, such as ESA listing as threatened or endangered, the Sand Mountain blue butterfly's habitat will be completely destroyed.

On April 27, 2004, BLM is hosting a public meeting in Fallon, NV to discuss issues that will be considered in the Churchill County plan. One item on their agenda is a consideration of Tonenna's proposal to create an ACEC at Sand Mountain. Yet even if an ACEC is designated under the Churchill County plan at that time, *any prescriptive measures can not be implemented until the SMRA plan goes into effect next October at the earliest*. (Briggs, personal communication). However if BLM continues to bow under pressure from the ORV industry, they will not employ any actions that would restrict ORV use in the SMRA.

As shown above, there are no existing regulations protecting this area and the habitat for the sand Mountain blue butterfly.

C. Over-utilization for commercial, recreational, scientific, or educational purposes
In general, because of the high fecundity of individual insects, the collection of insects poses little threats to their populations and collection does not currently appear to be an issue for the Sand Mountain Blue butterfly. However, in the case of some endangered species that have small populations in limited geographic areas, collection could significantly reduce production of offspring. Because this butterfly is so rare, collection by overzealous lepidopterists is a potential threat. ESA listing as threatened or endangered will ensure that this does not become an issue in the future.

D. Disease and predation
There are a number of potential threats to the Sand Mountain Blue for which little information is available. Diseases affecting larval host plants and butterflies, and predation by native and introduced wildlife have adversely affected other butterfly species with small population sizes, but no information on their potential impacts to the Sand Mountain Blue is available.

E. Other natural or manmade factors affecting its continued existence

1) Population Dynamics and Structure

Many, if not most, insect populations normally experience large fluctuations in size (Ehrlich, 1992; Schultz 1998). Weather, predation, and disease may cause annual changes in butterfly numbers of an order of magnitude or more. Normal population fluctuations, coupled with habitat alteration or loss (sometimes seemingly minor habitat alterations) can result in population extirpations (Hanski *et al.*, 1995). Because of its extremely limited geographic area, this butterfly is extremely vulnerable to extinction.

2) Invasive species

Invasive plants are a common issue that impacts many imperiled butterflies. According to Tonenna's personal observation, the Russian thistle population in the SMRA is increasing. Invasive species such as the Russian thistle are prone to fire, however the Kearney buckwheat population is not adapted to resist fire and if a fire were to break out it could kill or seriously damage plants. Although fires have never burned in the Sand Mountain Blue butterfly's habitat, an increase in Russian thistle is directly related to an increased risk that a fire may break out (Tonenna, personal communication).

X. CONCLUSION

The Sand Mountain Blue needs to be given emergency protection under the federal Endangered Species Act. Off-road vehicles are an immediate threat to these butterflies and there are no regulatory mechanisms to protect them or their habitat (Figure 23).

Due to the threat of extinction and because of the Sand Mountain blue has a small population size, limited distribution, isolation, and the numerous factors threatening the species and its remaining habitat, the Center for Biological Diversity, The Xerces Society, Public Employees for Environmental Responsibility and the Nevada Outdoor Recreation Association formally petition for emergency listing as an endangered species. Furthermore, petitioners strongly request the Service to use their authority to establish Critical Habitat based on the facts presented to prevent further decline of this vulnerable butterfly species.

BLM's Tonenna believes that disturbances created by motorized recreational vehicles creates a constant and significant impact, which when combined with the natural dynamics of the dune environment overwhelm the flora and fauna to the point where we are faced with serious challenges in preventing extinctions of these rare endemic species (personal communication). A prime objective of the BLM is to protect and preserve natural plant and animal communities in the areas surrounding the mountain (BLM, 1986). Even groups like The Reno "4" Wheelers were once in favor of barriers and fencing of areas which contain rare, endangered or threatened species (Fine, 1978). According to George Austin, the zoologist who formally described the Sand Mountain blue in 1998, the key to preserving this butterfly is to ensure the continued existence of its host plant in large enough numbers to maintain a viable population of the insect (Austin, 2002). If the vegetation of the dunes is lost, the arthropods associated with it will also be lost (Rust, 1981). In sum, the critical threat to the viability of Sand Mountain and its unique suite of plants and invertebrates, especially the Sand Mountain blue, is the degradation of the vegetated dunes from recreational vehicle use and abuse and only ESA listing can protect and recover the species. The Sand Mountain Blue butterfly clearly warrants listing on an emergency basis (The Nature Conservancy of Nevada, 2003).

Dune ecosystems found throughout the world are treasures of biological diversity. The dynamic and harsh conditions found within the dune ecosystem produce unique and resilient flora and fauna able to withstand and thrive in such an environment. The Sand Mountain dunes are a natural treasure for which the neglect and abuse of the past is no longer acceptable.

Figure 23: Example of lost habitat at Sand Mountain due to year-round intensive ORV use. *DRP photo*.

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