Petition to List the Sand Dune Lizard *Sceloporus arenicolus* as a Threatened or Endangered Species under the U.S. Endangered Species Act

Center for Biological Diversity

May, 2002

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

The Center for Biological Diversity, Chihuahuan Desert Conservation Alliance and Noah Greenwald hereby formally petition to list the Sand Dune Lizard (*Sceloperus arenicolus*) as 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 Assistant Secretary of the Interior.

Petitioners also request that Critical Habitat be designated concurrent with the listing, as required by 16 U.S.C. § 1533(b)(6)(C) and 50 CFR 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

Petitioners understand that this petition action sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service and very specific time constraints upon those responses. See 16 U.S.C. § 1533(b).

Petitioners:

Center for Biological Diversity is a non-profit public interest organization dedicated to protecting the diverse life forms of western North America. It has offices in New Mexico, Arizona, and California.

Chihuahuan Desert Conservation Alliance works to encourage the understanding, appreciation and protection of all the elements of the Chihuahuan Desert.

SUMMARY

The sand dune lizard is at immediate risk of extinction. It has a highly fragmented distribution, specialized habitat requirements and the second narrowest range of any lizard endemic to North America, only occurring in shinnery oak sand dune communities of southeastern New Mexico and southwestern Texas. Removal of shinnery oak using the herbicide Tebuthiuron and oil and gas development on both public and private lands are resulting in the rapid destruction and degradation of the sand dune lizard's habitat, leading to population declines and further fragmentation of its distribution. Existing regulations to protect the sand dune lizard from these threats are inadequate to ensure the continued existence of the species. In combination, these facts indicate the sand dune lizard merits listing under the Endangered Species Act.

Figure 1. Female sand dune lizard under shinnery oak (courtesy of Don Sias).

I. SPECIES DESCRIPTION

A small diurnal species of *Sceloporus*, the sand dune lizard (*Sceloporus arenicolus*) has a maximum snout to vent length (SVL) of 70 mm in females and 65 mm in males (Degenhardt et al. 1996). Its upper surface is light brown without distinct pattern. A grayish-brown band extends from the ear onto the tail. On some individuals, the chin and throat has scattered blue flecking (Ibid.) Dorsal scales are keeled and pointed. Degenhardt and Jones (1972) report a mean of 48 and a range of 41-52 scales around midbody (as reported in Degenhardt et al. 1996). Degenhardt et al. (1996) note: "the supraoculars are small and separated from the superciliaries as well as the median head scales by at least one row of smaller scales." Sand dune lizards have 9-16 femoral pores on each leg.

II. TAXONOMY

The sand dune lizard, *Sceloporus arenicolus*, was originally classed with the sagebrush lizard, *Sceloporus graciosus* (Baird and Girard 1852). Populations of the latter in southeast New Mexico and adjacent portions of Texas were first reported in 1960 (Sabath 1960). They were proposed as a potentially distinct subspecies in 1968 (Kerfoot 1968) and first described as such, *S. gracious arenicolous* [sic], in 1972 (Degenhardt and Jones 1972). The taxon was recognized as its own species in 1992 (Smith et al. 1992). This designation was successfully used to construct phylogenies of the genus Sceloporus based on both molecular and morphological data (Wiens and Reeder 1997).

III. DISTRIBUTION

The sand dune lizard occurs in shinnery oak (*Quercus havardii*) sand dune habitats in extreme southeastern New Mexico and adjoining portions of Texas. The species possesses the second-smallest range of any lizard species endemic to North America. Its geographic range was only recently systematically described. Fitzgerald et al. (1997) surveyed the known range of the sand dune lizard in New Mexico and found that the species' range forms a crescent shape stretching from eastern Chaves county, southernmost Roosevelt and northernmost Lea counties southward and eastward into northeastern Eddy and southern/central Lea counties (Figure 1). The most densely populated cluster of sites is in the Mescalero Sands region of eastern Chaves and northeastern Eddy counties. In Texas, the species occurs in five counties to the south and east of Jal, including Andrews, Crane, Gaines, Ward, and Winkler, but the extent of the lizard's range in Texas is poorly understood, as is the status of populations there (Axtell 1988, Dixon 1987, Painter et al. 1999). Painter et al. (1999) stated that the range of the sand dune lizard in Texas is "extremely limited and fragmented by areas of unsuitable habitat." Throughout the

range in New Mexico and Texas elevations vary from approximately 780 to1400 meters or 2550 to 4594 feet (Painter et al. 1999).

In New Mexico, approximately 48.9% of the sand dune lizard's range occurs on BLM lands, 20.1% occurs on state lands and 30.9% occurs on private lands (Painter et al. 1999). Populations in Texas exist largely on private land.

In New Mexico, the species' potential and occupied habitat consists of only 1,697.3 sq km or 655.3 sq miles (Painter et al. 1999). Fitzgerald et al. (1997) noted that "an outstanding feature of the range is its narrow shape." At its widest, the sand dune lizard's range is only 16.7 to 25.7 km with some areas less than 1.5 km wide. Because of this narrowness, the species is vulnerable to breaks caused by habitat loss or other factors, potentially disrupting dispersal and gene flow and possibly leading to localized extinction. Sias and Snell (1998) have identified four areas of concern where a combination of oil and gas development and Tebuthiuron treatment have led to habitat loss in narrow portions of the sand dune lizard's range (see below). Fitzgerald et al. (1997) also noted several breaks in the species range likely related to both natural and anthropogenic factors. The northwestern portion of the range is separated from the Mescalero Sands by 23.8 km and three locations in Roosevelt County are separated by 27.5 km from other populations to the south. Painter et al. (1999) identified a fourth break in the northern portion of the species range, dividing the population in New Mexico into four disjunct groups (Figure 1).

The sand dune lizard's ability to disperse across unsuitable or unoccupied habitat is unknown. However, mark-recapture studies indicate the species exhibits high site fidelity and thus there may be little to no exchange between disjunct populations (Snell et al. 1997). Fitzgerald et al. (1997) documented that sand dune lizards do not occupy apparently suitable habitat in New Mexico south of the town of Jal, even though the habitat is only separated from similar occupied habitat by a narrow area of unsuitable habitat. Although it is possible that an unknown aspect of the habitat may make it unsuitable, it is more likely that in the words of Painter et al. (1999), "the species may not disperse into areas of suitable habitat, even across narrow barriers of unsuitable habitat." It is unknown whether the species formerly occupied this area and went extinct or whether its range never extended further south.

Since the range of the sand dune lizard was so recently described, it is impossible to determine the extent of loss of habitat or range. Due to the extent of habitat alteration, several authors have concluded that there almost certainly has been significant loss of habitat (Painter et al. 1999, Snell et al. 1997). Peterson and Boyd (1998) noted that 100,000 acres of shinnery oak habitat in New Mexico had been treated with the herbicide Tebuthiuron in the last 15 years, and that 1,000,000 acres in Texas and an unknown smaller acreage in New Mexico had been converted to cropland or grassland. Although not quantified, oil and gas development has also resulted in extensive habitat alteration (Sias and Snell 1998). Based on the extent of habitat loss, Snell et al. (1997) concluded:

"Significant amounts of habitat alteration have already occurred throughout the range of the species and there is little doubt that the current distribution is a small part of a larger range in the past."

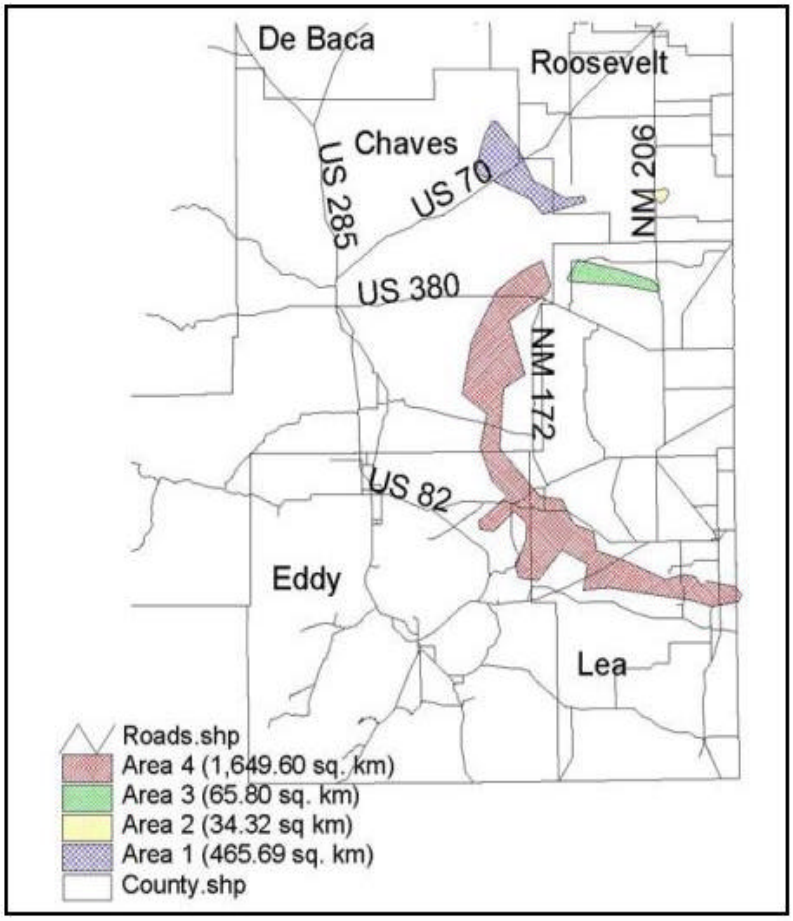

Figure 2. Map depicting the four sand dune lizard populations in New Mexico, courtesy of Mr. Don Sias.

IV. NATURAL HISTORY AND HABITAT REQUIREMENTS

A. HABITAT REQUIREMENTS

S. arenicolus is "a remarkable habitat specialist," occurring only within and around blowouts in shinnery dunes habitat, i.e. in wind-hollowed depressions in "sand shinnery" dune communities co-dominated by shin-oak shrubs (Q havardii also known as Havard oak, midget oak, or sand shinnery oak) and grasses (Fitzgerald et al. 1997, Figure 3). Fitzgerald et al. (1997) compared habitats occupied by sand dune lizards to random points to determine habitat selection. Sand dune lizards avoided shallow blowouts and used deep (>300 cm) and long (32.9 m, sd = 29.46 m) blowouts more than expected based on availability. Fitzgerald et al. (1997) believe that larger dunes provide superior habitat, stating:

> *"In pristine shinnery dune habitat, large deep blowouts possess more edge for cover, more open sand and steeper slopes. The deeper blowouts present a much larger three-dimensional surface area from which the lizards may choose microsites that combine their thermoregulatory needs with those of foraging, protection from predators and mate seeking."*

The sand dune lizard also selected blowouts with a cooler substrate and more northerly and easterly aspects than random points. Using principal component analysis, Fitzgerald et al. were able to explain most of the variation (90%) in habitat utilized by the sand dune lizard, with the first axis explained by a gradient in temperature (both air and substrate), the second axis explained by a gradient in blowout size (depth class and length), and the third axis explained by a combination of aspect and cover (northeast aspect with long distance to cover at one end and southwest aspect with more vegetation on the other end of the axis). Sand dune lizards do not use dunes that lack shinnery oak, which they probably use for cover from predators, foraging, and shade.

Interestingly, sand dune lizard's selected sites with more medium sand grains (>250-354 µm) and less coarse, fine and extra fine grains, though the reasons for this are not yet fully understood (Fitzgerald et al. 1997). One possibility is that fine-grained sand inhibits respiration when sand dune lizards bury themselves to avoid predators or to regulate their temperature.

Because the sand dune lizard is dependent on a feature of the landscape—dune blowouts—that is spatially dynamic, protection of habitat presents a difficult problem. As wind blows sand across the landscape, areas that are suitable today may not be in the future and areas that are unsuitable may become so in the future. For this reason, protecting only currently suitable habitat for the lizard is insufficient to sustain the species in the long-term. Fitzgerald et al. conclude:

> *"We recommend for the long-term conservation of S. arenicolus, the view must be embraced that the range, distribution, and even the populations of the lizards themselves are dynamic entities that move across the landscape… The viewpoint that the range and distribution of S. arenicolus is static is illogical and dangerous not only to sand dune lizards, but also to the unique shinnery dunes environment. Ecosystem engineering by humans, either by default through indirect effects of activities that fragment the landscape (e.g., construction of roads), or directly by removing shinnery oak in areas where S. arenicolus does not occur presently can only be justified by a short term and static view of a landscape that is obviously dynamic."*

In sum, the removal of shinnery oak in areas where the dune lizard may not currently occur poses a serious problem because sands move over time. This threat is real with continued

proposals for spraying on public lands and active spraying programs on private land, of which we have limited knowledge.

Figure 3. Sand blowout surrounded by shinnery oak, exemplifying optimal sand dune lizard habitat (Courtesy of Don Sias).

B. DIET

Degenhardt et al. (1996) report that sand dune lizards eat "ants and their pupae, small beetles (including ladybirds) and their larvae, crickets, grasshoppers, and spiders." Prey are taken in or adjacent to patches of vegetation (Ibid.)

C. REPRODUCTION AND SURVIVAL

Females reach sexual maturity in their first spring after hatching with vitellogenesis beginning in late April (Degenhardt et al. 1996). Some individuals live and reproduce for two years. Females can produce 1-2 clutches with 3-6 eggs per clutch (Ibid.) The first clutch is laid in late June and the second in late July (Degenhardt and Jones 1972, Sena 1985 as reported in Degenhardt et al. 1996). Hatching occurs between late July and late September. Juvenile and adult survival has not been calculated for the sand dune lizard, but it is known that some individuals live and reproduce for two years. Snell et al. (1997) concluded: "the short lifespan and relatively reduced reproductive output of sand dune lizards further compounds the possibility of extinction."

D. CO-OCCURRING SPECIES

Other reptiles occurring in shinnery communities include the Western box turtle (*Terrapene ornata*); approximately 25 species of snakes, among which the most common are the plains hognose snake (*Heterodon nasicus*), night snake (*Hypsiglena torquata*), coachwhip (*Masticophis flagellum*), bullsnake or gopher snake (*Pituophis melanoleucus*), milksnake (*Lampropeltis triangulum*), massasauga (*Sitrurus catenatus*), and prairie rattlesnake (*Crotalus viridis*); and ten lizard species, the prairie lined racerunner (*Cnemidophorus sexlineatus*), western whiptail (*C. tigris or C. marmoratus*), Great Plains skink (*Eumeces obsoletus*), leopard lizard (*Gambelia wislizenii*), lesser earless lizard (*Holbrookia maculata*), Texas horned lizard (*Phrynosoma cornutum*), roundtail horned lizard (*P. modestum*), prairie lizard (*Sceloporus undulatus*) and side-blotched lizard (*Uta stansburiana*) (Degenhardt and Jones 1972, Degenhardt et al. 1996, Gorum et al. 1995, Wolfe 1978). Of these, the side-blotched lizard is believed to be the primary competitor with the sand dune lizard (Sias and Snell 1998, Snell et al. 1997). Sias and Snell (1998) found a negative relationship between side-blotched lizard and sand dune lizard abundance and that side blotched lizard benefited from anthropogenic habitat alteration. This suggests that habitat degradation may benefit the side-blotched lizard at the expense of the sand dune lizard.

V. POPULATION STATUS

The sand dune lizard possesses many characteristics of a species at risk of extinction. It is an extreme habitat specialist, has a restricted and fragmented distribution and is rapidly losing habitat to Tebuthiuron treatment and oil and gas development. Based on these factors, leading researchers of the sand dune lizard concluded: "the extinction of *Sceloporus arenicolus* is a real possibility" (Snell et al. 1997).

The sand dune lizard's fragmented range leaves the species vulnerable to local extinction from anthropogenic factors, such as habitat loss, and environmental (e.g. fire) or demographic stochasticity (e.g. poor reproduction years or skewed gender ratio) with little chance of recolonization of habitat. This problem is compounded by the species' potentially poor ability to disperse.

The sand dune lizard is an extreme habitat specialist that is highly vulnerable to habitat alteration. Carefully executed studies found sharp population declines in response to habitat alteration related to vegetation removal and oil and gas development (Snell et al. 1997, Sias and Snell 1998). These factors have already resulted in considerable habitat loss and are ongoing today.

VI. LISTING PRIORITY

Confirming the above concerns about the status of the sand dune lizard, the USFWS listed the species as a candidate for listing, stating:

> *"The limited geographic range of the sand dune lizard poses a significant threat of extinction for this species given the loss and degradation of suitable habitat and increased risks of extinction from the present or threatened destruction of its habitat and random or human-caused events. Considering the magnitude and imminence of threats and the vulnerability of extant localities, the lizard is likely in danger of extinction in all or a significant portion of its range."*

The USFWS gave the sand dune lizard a status of priority 2 for listing. This is the highest priority that can be given at the species level, indicating the magnitude of threat is high and imminent. Based on this priority listing, the USFWS should expedite this petition.

VII. THE PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF THE SAND DUNE LIZARD'S HABITAT OR RANGE:

A. SHINNERY OAK REMOVAL

Removal of shinnery oak using the herbicide Tebuthiuron is a common practice in the range of the sand dune lizard because the plant is poisonous to livestock during the spring and competes with grass and forbs for water and nutrients (Peterson and Boyd 1998). Shinnery oak removal has documented detrimental effects on the lizard. In an extensive and carefully planned five year study on the effects of shinnery oak removal on sand dune lizard populations, Snell et al. (1997) determined that shinnery oak removal results in drastic reductions in lizard numbers. Sand dune lizard numbers were 70-94% less on chemically treated plots compared to adjacent and similar untreated plots with several of the treatment plots experiencing 100% reductions. These differences were attributed to reduced densities or elimination of shinnery oak with Snell et al. concluding:

> *"Thus our current conclusions are that shinnery oak removal as practiced on the pastures used in our study ultimately results in greatly reduced populations of sand dune lizards, as well as most other lizard species. We further conclude that this reduction is not due to the direct application of the herbicide Tebuthiuron, but to long-term effects associated with the removal or absence of shinnery oak."*

Peterson and Boyd (1998) reported that shinnery oak was removed from at least 100,000 acres of the New Mexico between 1983-1998 and that many more acres are targeted for treatment. Based on the extensive removal of shinnery oak that has already occurred, Painter et al. (1999) speculate that it is "reasonable to assume the population trends for this species have been downward since the initiation of the Tebuthiuron treatment program." Moreover, Snell et al. concluded that the biology of the species make it particularly vulnerable to further habitat loss caused by shinnery oak removal. They state:

> *"The combination of a small geographic range characterized by a patchy distribution associated with a single plant species is a tenuous situation at best. The short lifespan and relatively reduced reproductive output of sand dune lizards further compounds the possibility of extinction. Adding the potential renewal of a shinnery oak removal program makes the situation alarming."*

The BLM currently maintains a moratorium on using Tebuthurion in occupied or suitable habitat. The Roswell Resource Area, however, recently proposed to treat areas adjacent to occupied dunes (Bogle Shinnery Oak Removal Environmental Assessment). Although avoiding occupied habitat, the project may still harm the species by isolating populations. Snell et al. (1997) conclude:

> *"The practice of protecting isolated areas of outstanding habitat while removing the surrounding shinnery oak raises several important concerns. We do not know how large these areas need to be to sustain viable populations of sand dune lizards. We do not know if there is any possibility of gene flow between these isolated populations since we do not know if lizards will traverse the treated habitats to cross from one protected area to another."*

Little is known about current dispersal habitat, but C. Painter of New Mexico Game and Fish expressed doubt that lizards will disperse through areas lacking in shinnery oak (personal communication). Moreover, Tebuthiron spraying and other land management practices are widespread on private lands, placing a premium on the biological value of sand dune lizard habitat on public land.

On private lands, recent proposals have called for increasing already active treatment programs. As recently as July, 2000, the Natural Resources Conservation Service (NRCS) proposed treating as much as 250,000 acres of shinnery oak with Tebuthiuron (Environmental assessment for the implementation of the environmental quality incentives program in the five states grazing emphasis geographic priority area).

After the U.S. Fish and Wildlife Service wrote them a letter expressing serious concerns about the program (Letter from Jennifer Fowler-Propst to Rosenda Treviño III, November 8, 2000), the NRCS scaled back the program. Their current plan is to consider treating areas with >40% cover of shinnery oak (David Seary, NRCS Biologist, personal communication, March 19, 2002), leaving open the possibility of further impacts to sand dune lizard habitat. Records are not kept of private landowners who use Tebuthiuron and thus it is impossible to quantify the number of acres that are currently being treated. It is likely, however, that many thousands of acres continue to be treated or will be treated in the future. John Sherman, biologist for the BLM in Carlsbad, stated that Tebuthiuron treatment is ongoing and common on both state and private lands in the Carlsbad area (personal communication, March 20, 2002). Tebuthiuron

treatment is also common in Texas where all sand dune lizard habitat occurs on private lands (C. Painter personal communication, March 19, 2002).

B. OIL AND GAS DEVELOPMENT

Much of the sand dune lizard's current range has been developed or is planned for development of oil and gas extraction with the USFWS (2001) concluding "extensive oil field development, residual toxic contamination, and reduced and fragmented habitat increase the risk of extinction for the sand dune lizard." Sias and Snell (1998) studied the effects of oil and gas wells on sand dune lizard abundance from 1995 to 1997. In 1995, they found a 39% reduction in lizard abundance on plots 0-80 m from wells compared to plots more than 190 m from wells. Based on these results, they expanded their study in 1996 and 1997 to examine effects of oil and gas wells on lizard populations at larger scales. This analysis found a negative relationship between well density and abundance of the sand dune lizard in both 1996-1997. Regression analysis predicted that well densities of 13.64 wells/mi^2 result in a 25% decline in sand dune lizard abundance, densities of 29.82 wells/mi^2 result in a 50% decline in abundance, and densities of 34.36 wells/mi^2 (this was the highest density found in their study area) result in a 56.12% decline in abundance. Significantly, they also found reductions in sand dune lizard abundance in habitat distant from wells (300-600 m). Any wells within 600 m of habitat resulted in 31-52% fewer sand dune lizards than areas with no wells with the effect of a single well resulting in a predicted 47% reduction in the sand dune lizard in an area extending 253 m around the well or 50152 m^2 (Ibid.) Sias and Snell also found that the greatest decreases in abundance occurred in the best habitats. A regression analysis of 11 counts from the best habitats produced a substantially steeper negative decline than when all the data was considered together (-.032 vs. -.012).

Sias and Snell (1998) found that pipeline cuts and sand roads associated with oil and gas development supported greater numbers of sand dune lizards than areas without these features. However, they note that because of the frequency of spills and because of roadkill, these features may be population traps:

> *"Pipeline cuts in shinnery oak habitat may benefit S. arenicolus because they attract lizards and represent new blowout habitat and possible dispersal corridors. However when gas and oil pipelines are not maintained and they leak, this attraction turn into a lethal trap."*

Sias and Snell (1998) believed that oil and gas extraction resulted in reduction in abundance of sand dune lizards because of direct habitat loss to roads and well pads, poisoning of lizards from spills and gas leaks, roadkill related to increased traffic, and potentially by favoring a competitor of the sand dune lizard—the side-blotched lizard (*Uta stansburiana*). On the issue of pollution, the authors state:

> *"Around wells and batteries that emit gasses, we saw sick and dead animals… We saw a 140 m diameter dead spot centered on a leak in an underground gas*

pipeline on the NM/TX border. We have come across gas hissing out of pipelines in the bottom of blowouts. Around some oil wells we have encountered oil spills that entangle lizards with tar and oil. At a battery emitting H_2S in the CON.N region we ran across sick great horned owls and in the surrounding huge blowouts, prime habitat for S. arenicolus, an absence of lizards."

H_2S a common byproduct of oil and gas extraction is heavier than air and is believed to collect at the bottom of blowouts used by the lizard, potentially leading to poisoning.

On the issue of competition, Sias and Snell determined that habitat alteration benefits the side-blotched lizard, which they observed directly competing with the sand dune lizard for prey. Overall, they concluded that the sand dune lizard was the most susceptible to oil and gas development, stating:

"The contrast between other reptile species and S. arenicolus when viewing well density relationships leads us to conclude that S. arenicolus is much more sensitive to environmental alterations than other sympatric reptiles. This is consistent with S. arenicolus being a habitat specialist and the other species being habitat generalists. It is also consistent with S. arenicolus occupying a very small geographic range spanning a narrow set of environmental conditions and the other sympatric species occupying huge geographic ranges."

Given these conditions, it is easy to see how oil and gas development may give the side-blotched lizard a competitive advantage over the sand dune lizard.

Past and ongoing oil and gas development has already resulted in substantial losses of habitat for and reductions in abundance of the sand dune lizard. Sias and Snell (1998) reported the highest well densities in the southern portion of the species range. They identified four areas of concern that had well densities >25 wells/mi^2:

1.) The MON region is five miles south and three miles west of Monument and occurs in an area where shinnery oak habitat of the sand dune lizard is less than a mile wide, raising concerns that further oil and gas development will lead to a barrier to sand dune lizard movement and gene flow.

2.) The DEV region, six miles west and one mile north of Maljamar, contains high quality habitat supporting large populations of sand dune lizard, surrounded by areas treated with Tebuthiuron. Sias and Snell believe that "unrestricted future development in the DEV region would destroy a source population with the potential to recolonize Tebuthiuron treated areas to the north and west."

3.) The CON.N oil fields—north of Hwy. 529, south of Hwy. 82 and west of Lea Co. Rd 33—occupy the entire width of the sand dune lizard's range. Sand dune lizards were 43% less

in this area than in areas of low well density. Sias and Snell (1998) state that "unrestricted future development will further reduce populations locally and on a larger scale it will sever the habitat corridor between southern *S. arenicolus* and populations north of Hwy. 82."

4.) The EUN region, north of Eunice on both sides of Hwy. 18, contains an important but narrow corridor (less than a mile wide) between populations in New Mexico and populations in Texas. West of Hwy. 18 habitat has been impacted by both Tebuthiuron treatment and oil and gas development, and Sceloporus arenicolus currently only exist, albeit at reduced densities, in the oil and gas fields (Snell and Sias 1998).

Sias and Snell (1998) conclude:

> *"These regions are so densely developed that increases in the number of wells will undoubtedly reduce S. arenicolus populations over large areas to a marginal state, if for no other reason than such a high percentage of habitat would be destroyed and covered with caliche."*

Oil and Gas development is permitted on the majority of the Carlsbad and Roswell Resource Areas with little protection provided to the sand dune lizard. According to the Carlsbad Resource Management Plan, 95% or 3,907,700 acres of the 4,095,000 acres managed by the Resource Area are open to oil and gas leasing (USDI 1997). Similarly, 96% or 9,316,200 acres of the Roswell Resource Area are open to oil and gas development. John Sherman, biologist for the Carlsbad Resource Area, estimated that they are processing roughly 400-600 permits for oil and gas development per year, of which about half are for drill pads. Roswell is permitting fewer wells with Rand French, the biologist for Roswell Resource Area, estimating that they are processing roughly 200 oil and gas development actions per years with about 70-80 for drill pads. Both biologists indicated that oil and gas development on private and state lands in the area was substantial. Thus, oil and gas development is clearly ongoing and resulting in further habitat loss for the sand dune lizard.

C. OFF-ROAD VEHICLE USE

The direct effects of off-road vehicles (ORVs) on sand dune lizards have not been studied. Painter et al. (1999), however, notes that ORV use may erode the shinnery edges of blowouts and present problems to inactive *S. arenicolus* buried in the sand." ORVs have been found to result in reductions in abundance of other lizard species in at least one other study (Busack and Bury 1974). Within the range of the sand dune lizard, the Mascalero Sands North Dune ORV Area receives heavy use. Rand French of the Roswell Resource Area reported that there is dispersed ORV use primarily during the hunting season and that there are few to no signs to direct hunters away from sensitive areas or to stay on designated trails and roads (personal communication March 20, 2002).

D. LIVESTOCK GRAZING

Similar to ORV use, the effects of livestock grazing on sand dune lizard abundance (exclusive of Tebuthiuron treatment) have not been formally studied. Painter et al. (1999) reports that sand dune lizards "are not found in extensive open sand dunes, a habitat formation potentially associated with heavy grazing." Peterson and Boyd (1998) note that high stocking rates are believed to result in loss of perennial grasses and to have increased bare ground and wind erosion. At least two other studies in the southwest have determined that livestock grazing results in reduced abundance of other lizard species (Bock et al. 1991, Jones 1981). In combination, this evidence suggests that livestock grazing may negatively affect sand dune lizard abundance and needs further study.

VIII. OTHER NATURAL OR MANMADE FACTORS AFFECTING THE SAND DUNE LIZARDS'S CONTINUED EXISTENCE

Given the sand dune lizard's narrow and fragmented range, and potentially limited dispersal ability, the species is at risk of extinction solely from demographic factors. Indeed, Snell et al. (1997) concluded:

> *"We feel it is important to point out that due to the constraints of the biological situation there may be no management activity that can absolutely prevent the extinction of sand dune lizards."*

The above statement highlights the need for immediate listing and development of a recovery plan that will consider both biological and management issues.

IX. INADEQUACY OF EXISTING REGULATORY MECHANISMS

In listing the sand dune lizard as a candidate species, USFWS (2001) concluded:

> *"The sand dune lizard occurs on Bureau of Land Management, state of New Mexico, State of Texas and private lands. There are no regulatory mechanisms in effect to provide protection for this species or its habitat on any of these lands."*

The following sections provide further review of lack of regulation to protect the sand dune lizard on BLM, state and private lands.

A. STATES

Neither New Mexico nor Texas has enacted substantial regulations to protect the sand dune lizard with USFWS (2001) concluding "there are no state regulations in New Mexico or Texas

that offer formal protection for take of individual sand dune lizards or its habitat." There are no restrictions on shinnery oak removal on state or private lands and according to John Sherman, biologist with the Carlsbad Resource Area, Tebuthiuron use is common on private and state lands in both states. Similarly, the state's set very few requirements on oil and gas development on private and state lands. The New Mexico Oil Conservation District does limit well numbers to 16/section, but allows exceptions up to 48 wells/section. As noted above, Sias and Snell (1998) documented that well densities of as low as 13.64 wells/section result in population declines, indicating that well densities allowed by the state will and do impact sand dune lizard populations. The state's also fail to prohibit locating wells, roads or other sources of habitat alteration directly in occupied sand dune lizard habitat. Indeed, J. Sherman indicated that in one case the BLM attempted to relocate a well away from occupied habitat and the company opted to place the well in occupied sand dune lizard habitat on an adjacent parcel of state land.

New Mexico does list the sand dune lizard as a threatened species under the state's Wildlife Conservation Act (NMDGF 2000)[1]. This designation, however, fails to provide substantial protection because only state endangered, but not threatened, species are protected from take (New Mexico statutes 17-2-41(C)). The Wildlife Conservation Act does call for development of a recovery plan for threatened species when practicable and accordingly New Mexico Department of Game and Fish has developed a draft management plan (Painter et al. 1999). Unfortunately, this plan has to date not been enacted and according to a letter from the USFWS (letter from J. Fowler Propst to Mr. Jerry A. Marracchini, NMDGF, September 28, 1999) failed to sufficiently address threats to the sand dune lizard and as a result would not guarantee the continued existence of the species. A number of the key points of this letter are summarized below:

1.) "The management plan contains insufficient management and conservation recommendations," including: a recommendation that Tebuthiuron treatment be allowed within 500 m of occupied habitat, despite lack of data to suggest that this is sufficient, and lack of protection for unoccupied habitat.

2.) Relegation of management to just 8% of potential and occupied habitat of the sand dune lizard with the USFWS noting that "it is doubtful that management on this limited area would ensure the long-term persistence of this species."

3.) Failure to include pertinent data on the impact of oil and gas development, resulting in the inaccurate statement that "moderate density oil field development does not present an imminent threat to *S. arenicolus*." Such failure according to the USFWS resulted in insufficient recommendations for restrictions on oil and gas well placement with the agency particularly

[1] In Texas, the sand dune lizard does not have any special status and is not being studied or monitored, leaving it entirely unprotected.

questioning why wells were being allowed in habitat adjacent to occupied sand dunes, such as in shinnery oak flats.

4.) Failure to consider relevant literature on the impacts of ORV use or livestock grazing on other reptiles, vegetation or dunes that may suggest harmful impacts of these activities on sand dune lizard abundance or their habitat.

5.) Failure to include specific management goals or methods that would ensure the conservation of all known populations of the sand dune lizard, which was a stated objective of the plan.

6.) A need to design a plan that takes into consideration some of the concerns brought to light by primary researchers of the sand dune lizard with the USFWS stating:

> *"We believe that the opinions of the authors from each study report should not be taken lightly. For example, Snell et al. (1997) discusses the increased risk to small sand dune lizard populations, the short lifespan and low reproductive output, the alarming concern of shinnery oak removal, that there may be no management activity that can prevent the extinction of this lizard, that there is no way the sand dune lizard can persist indefinitely when shinnery oaks are eradicated, and that there is still the real possibility of local extirpation leading to extinction of this animal. These statements by specialists on the sand dune lizard greatly concern us. They demonstrate the need for a management plan that will eliminate all of the threats to this animal in order to avoid the extinction of this species."*

In response to this poignant letter, New Mexico Game and Fish is revising the management plan, expecting to finish by June 1, 2002. At that time, we will update the petition with an evaluation of the plan that utilizes the above criteria to "eliminate all of the threats" to the sand dune lizard, as an established standard.

In considering NMDGF's revised plan, the USFWS must note that under the Endangered Species Act, the agency is not to consider planned and future management actions when determining whether a species meets the requirements of a threatened or endangered species, but instead only the current management and status of the species. In numerous cases, the Fish and Wildlife 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 a 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. Given its perilous status and ongoing threats, the sand dune lizard requires immediate protection.

B. BUREAU OF LAND MANAGEMENT

As stated above, nearly 50% of all sand dune lizard habitat occurs on BLM lands in New Mexico on the Roswell and Carlsbad Resource Areas (RAs). Impacts to lizard populations and habitat continue from oil and gas leasing, livestock grazing, ORVs, and potentially shinnery oak removal with USFWS (2001) noting "the BLM currently does not have a management plan that addresses threats to the species or specific conservation and recovery needs of the sand dune lizard."

Oil and gas leasing. Oil and gas development continues on both the Roswell and Carlsbad Resource Areas with permits for new well-pads, roads and pipelines numbering in the hundreds every year (French and Sherman personnel communication, March 20, 2002). Permitting is likely to increase in the near future because President Bush's energy policy directs the BLM to find ways to "eliminate the impediments to oil and gas leasing, including possible modifications to land status and lease stipulations" (BLM Implementation of the National Energy Policy, USDI BLM 2001). A likely means to remove impediments is to reduce environmental review. Currently, 95% or more of BLM lands in New Mexico are open for oil and gas leasing.

The Carlsbad Resource Area maintains a prohibition on "surface disturbances" from oil and gas leasing within 100 m of occupied sand dune lizard habitat with an amendment to their resource management plan, stating:

> *"Surface disturbance will not be allowed in documented occupied habitat areas, or within up to 100 m of suitable habitat associated with occupied habitat areas identified through field review" (USDI BLM 1997a).*

This provision allows for exceptions stating: "an exception to this restriction will be considered when an on-site evaluation of habitat extent, available species occurrence data, the proposed surface use, and proposed mitigations indicate the proposal will not adversely affect the local population" (Ibid.) The Roswell Resource Area does not currently have a similar prohibition in their resource management plan, but R. French stated that in issuing permits, they attempt to avoid occupied habitat by moving planned drill pads and other sources of surface disturbance (Personal communication, March 20, 2002).

Although these provisions provide a modicum of protection for the sand dune lizard, they fall considerably short of what is needed given the critical status of the species. Sias and Snell (1998) found that an individual well results in a 47% reduction in lizard abundance in a 253 m radius and that reductions can occur 300-600 m from wells. They also found that as well density increases, lizard populations decrease. By only requiring a buffer around occupied habitat of 100 m in the Carlsbad RA and no specified buffer on the Roswell RA, the above regulations do not fully protect occupied habitat against reductions associated with oil and gas development. Moreover, neither RA maintains a limit on the density of wells around occupied habitat, despite the fact that Sias and Snell found impacts to populations from well densities as

low as 13.64 wells/mi^2. The BLM does have to follow state well density requirements, but as discussed above these allow densities of 16 wells/mi^2 and in some cases up to 48 wells/mi^2. The provisions also leave out suitable habitat that is not currently occupied or "associated" with occupied habitat. Considering that Fitzgerald et al. (1997) found that 25% of suitable habitat is not occupied, this is a glaring omission.

The above requirements fail to consider sand dune lizard habitat and population fragmentation, including no provisions for maintaining habitat corridors or large blocks of habitat. Again, this is a glaring omission because the sand dune lizard is already known to occur in a fragmented range and to potentially have a limited ability to disperse. Indeed, Sias and Snell (1998) identified four areas where a combination of oil and gas drilling and shinnery oak removal could lead to breaks in the sand dune lizard's range. These areas do not receive any special management by the BLM. Finally, the provisions fail to consider the dynamic nature of sand dune lizard habitat (see Fitzgerald et al. 1997), allowing oil and gas activities in areas that in the present may not have the right conditions for the species, but in the future may develop into prime dune habitat. In essence, the above provisions are totally limited to site-specific evaluation and mitigation of oil and gas drilling and completely ignore the landscape effects of continued expansion and permitting of oil and gas development.

Shinnery Oak Removal. Up until the mid 1990s, shinnery oak removal using Tebuthiuron was rampant on BLM lands, resulting in extensive loss of habitat. At that time, Roswell RA initiated a ban on further treatment and Carlsbad RA dramatically scaled back their program. Currently, Roswell maintains a ban on shinnery oak removal through chemical treatment in suitable or occupied habitat (USDI BLM 1997b) and Carlsbad has not conducted any treatments in roughly five years (J. Sherman personal communication, March 20, 2002). Similar to the above provisions on oil and gas development, these provisions on shinnery oak fail to provide protection for areas that might be used for dispersal between populations and may become suitable habitat in the future were natural processes allowed to continue to shape the landscape. Roswell recently released an environmental assessment to conduct shinnery oak removal on 4,600 acres in shinnery flats that are adjacent to occupied sand dune lizard habitat. This type of action is almost certain to further fragment sand dune lizard habitat and isolate sand dune lizard populations.

Livestock grazing. Virtually all sand dune lizard habitat on BLM lands is open to livestock grazing. Despite the widespread nature of livestock grazing and the fact that the sand dune lizard is known to be sensitive to habitat alteration, the agency has not studied or monitored the effects on the species. We reviewed environmental assessments (EAs) for 12 allotments on the Roswell Resource Area.[2] Three of these did not consider affects on the sand dune lizard or its

[2] The twelve allotments are: 65009, 65013, 65034, 65033, 65066/65566, 65074, 61008, 65077, 65027, 65052, 61004, 61007. We received these documents through a FOIA requesting all EAs for allotments harboring the sand dune lizard, and thus this should have coverage for all relevant allotments on the Roswell Resource Area.

habitat and one concluded that there would be no impact to the sand dune lizard because of a lack of habitat. The other eight all reached the exact same conclusion:

> *"Under the proposed action, there would be minimal impacts to the sand dune lizard due to the dispersal of livestock. Areas where there is concentration of livestock (waterings and fence corners) the habitat may be of lower quality, but these areas are small in nature. Range improvements (pipelines) may enhance lizard habitat by creating open dunal areas that are usually bordered by shinnery oak."*

The EAs reference the most obvious impacts from cattle (e.g. those areas where vegetation is completely removed and soil compacted). Without monitoring or controlled studies, the BLM has no idea if cattle have more subtle effects on sand dune lizard populations by reducing cover, altering the prey base or other means. Lack of such knowledge precludes appropriate management on the part of the agency. Nevertheless, the EAs do suggest that livestock are having some impact. Despite this recognized impact, none of the EAs prescribe any mitigation measures. Both lack of monitoring and lack of mitigation for known impacts indicate the BLM is failing to enact appropriate regulations or management to protect the sand dune lizard.

ORVs. The BLM does not currently have any regulations to protect sand dune lizard habitat from ORVs. R. French stated that there are few signs to direct ORVs onto designated roads or trails (personal communication March 20,2002).

General. The BLM lists *S. arenicolus* as a Sensitive Species, which under the National Environmental Policy Act (NEPA) requires them to consider the site-specific impacts of projects on the sand dune lizard. NEPA, however, does not require the BLM to choose alternatives to avoid harm to the species.

C. U.S. FISH AND WILDLIFE SERVICE

The USFWS recently listed the sand dune lizard as a priority 2 candidate species (USFWS 2001). This designation fails to provide any protection to the sand dune lizard. Protections against take and jeopardy under sections 7 and 9 of the ESA only apply to, and recovery plans are only developed for listed threatened and endangered species. The agency often allows species to languish on the candidate list for years (e.g. Sidle 1998). On average, it has taken 8.7 years for species to make it from the candidate list to listing as threatened or endangered (Greenwald and Suckling unpublished data). Given the status of the sand dune lizard, listing must be done immediately.

D. PRIVATE

Private lands comprise 30% of the sand dune lizard's range in New Mexico and an unknown majority in Texas. The USFWS (2001) concluded "these lands play a substantial role in the lizard's continued existence," and "there are no local or state regulatory mechanisms pertaining to the sand dune lizard on state or non-Federal lands." Indeed, there are currently no regulations that would prohibit private land-owners from conducting shinnery oak removal or constructing oil and gas wells in suitable or occupied lizard habitat on their lands and apparently such activities are widespread (Sherman, French and Painter personal communication).

X. REQUEST FOR CRITICAL HABITAT DESIGNATION

Petitioners request the designation of critical habitat for the sand dune lizard concurrent with its listing. The sand dune lizard is known to be absent from approximately 25% of suitable habitat in New Mexico and an unknown amount in Texas. The species is associated with a dynamic feature of the landscape—shinnery dune blowouts—that move overtime, meaning that all areas within the range of the species, including shinnery flats, are potential habitat. Because of the critical status of the species and its small range, critical habitat should encompass all potential, suitable and occupied habitat, or the species' entire range.

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