

**CONSERVATION OF THE SAND DUNE LIZARD,  
IN NEW MEXICO**

**RECOMMENDATIONS BASED ON THE MANAGEMENT PLAN FOR THE  
SAND DUNE LIZARD**

DRAFTED BY CHARLES W. PAINTER

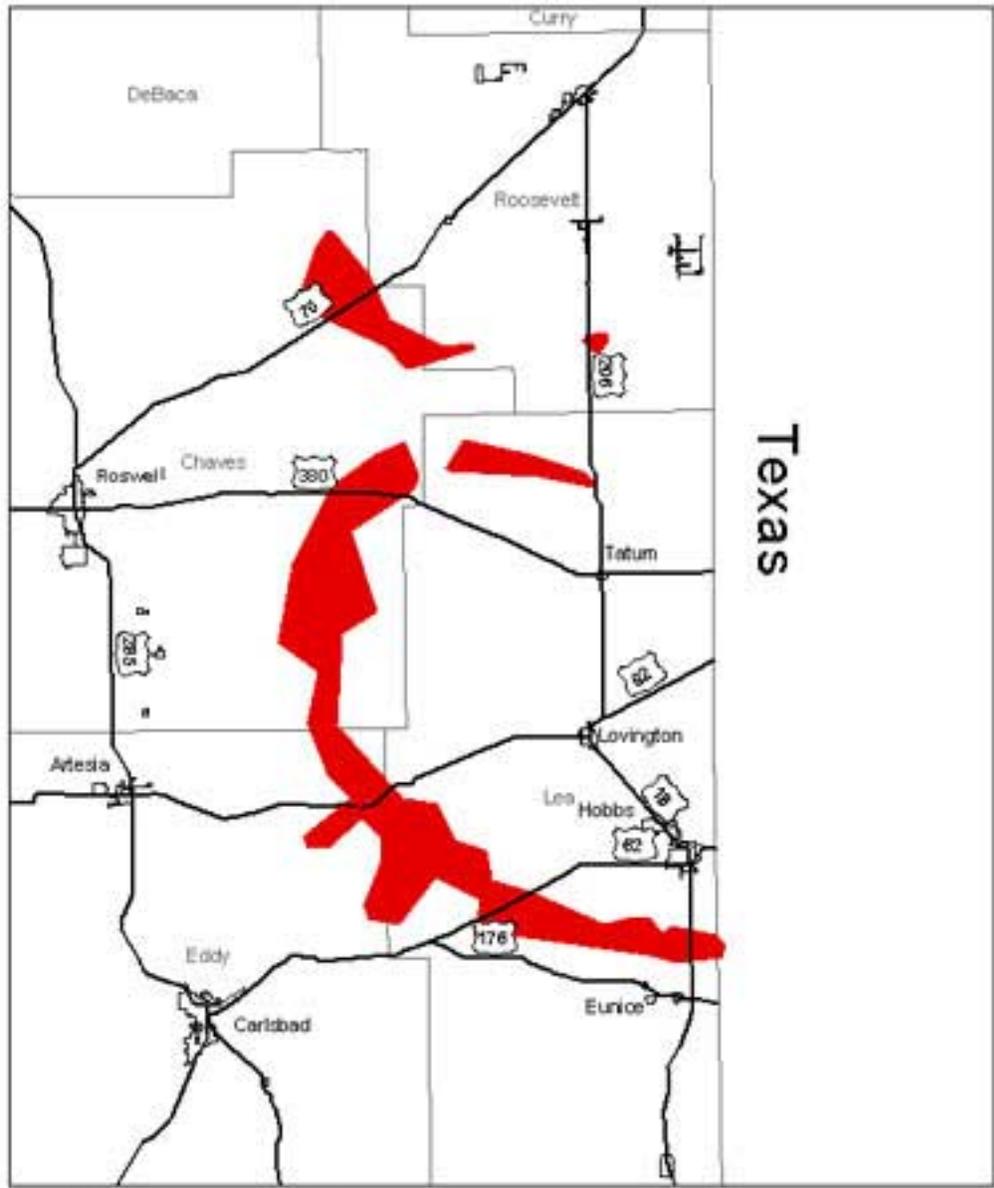
FEBRUARY 2004

This document contains an abbreviated explanation of the recommendations made in the 15 June 1999 MANAGEMENT PLAN FOR THE SAND DUNE LIZARD, *Sceloporus arenicolus* IN NEW MEXICO (Plan) and in the 20 June 2002 ADDENDUM NO. 1 (Addendum). For a definition of terms used in this document see the Glossary of Terms in the Plan and in the Addendum. As used in this document, "Threat" refers to intended or possible actions that could damage or endanger *S. arenicolus* populations or habitat. Further questions regarding recommendations from the Plan and Addendum should be directed to Charles W. Painter, NM Department of Game and Fish, Santa Fe, New Mexico.

Preparation of this Plan and Addendum was part of a much larger study of the status and distribution of the sand dune lizard on public lands in southeastern New Mexico carried out during the years 1991-1997. All recommendations made in this Plan and Addendum were based on peer-reviewed research findings reported in numerous reports prepared during that time (Fitzgerald et al. 1997; Gorum et al. 1995; Sias and Snell 1996; Sias and Snell 1998; Snell and Landwer 1991[1992]; Snell et al. 1993; Snell et al. 1994; Snell et al. 1997). Funding for these studies was provided by U.S. Fish and Wildlife Service, New Mexico Department of Game and Fish, Bureau of Land Management, and during 1995, the New Mexico Oil and Gas Association.

**CURRENT SPECIES STATUS**

The sand dune lizard is endemic to a small area of shinnery oak habitat in parts of southeast New Mexico and adjacent Texas (Map 1). In New Mexico, the species is known to exist as fragmented populations within an area of ca. 2,312 sq. km (892.6 sq. mi) in parts of Chaves, Eddy, Lee, and Roosevelt counties. However, within this area the potential and occupied habitat consists of only 1,697.3 sq. km (655.3 sq. mi). Total extent of the range in Texas is unknown although it includes parts of Andrews, Crane, Gaines, Ward, and Winkler counties. In New Mexico large populations of the sand dune lizard occur on lands managed by the U.S. Department of Interior, Bureau of Land Management, (BLM) although important populations occur on New Mexico state and private lands as well. Historic population sizes of *S. arenicolus* are unknown, although the chemical treatment and removal of shinnery oak and oil and gas extraction activities has caused the decrease or extirpation of some populations since the species was discovered in southeast New Mexico in 1960. The New Mexico Department of Game and Fish (NMGF) first listed *S. arenicolus* as a Group 2 Endangered Species on 24 Jan 1975, and it is currently listed as threatened. The species was listed as a Category 2 Notice of



Expected Range  
of the  
Sand Dune Lizard  
*Sceloporus arenicolus*



Review Species by the U.S. Fish and Wildlife Service (USFWS) in 1994, (it is currently considered a Species of Concern), and is listed as a Sensitive Species by BLM. The sand dune lizard receives no formal protection in Texas.

*Sceloporus arenicolus* is a small, terrestrial lizard restricted to sand dune formations inhabited by shinnery oak, *Quercus havardii*. Shinnery oak dunes support dense patches of shinnery oak and scattered sandsage, *Artemisia filifolia*, as co-dominant plant species and patches of open sand and wind-created sandy blowouts. Throughout the range in New Mexico and Texas elevation varies from ca. 780-1400 m (ca. 2550-4595 ft). There are significant differences in the composition of sand between sites occupied and unoccupied by *S. arenicolus*, with occupied sites having slightly coarser sand than unoccupied sites. The species is threatened by activities that remove the shinnery oak, alter the dominant vegetation structure, increase the percentage of grasses, disrupt the morphology of the sand dunes, or otherwise degrade suitable habitat.

Information on the effects of the herbicide treatment of shinnery oak on *S. arenicolus* populations is found in Gorum et al. 1995, Peterson and Boyd 1998, and Snell et al. 1991 [1992]; 1993; 1994; 1997. Data on the effects of oil and gas exploration and oil field development are found in Peterson and Boyd 1998, and Sias and Snell 1996; 1998. Information on distribution of the species is found in Axtell 1988, Censky 1986, Cole 1975, Conant and Collins 1991, Degenhardt et al. 1996, Dixon 1987, Fitzgerald et al. 1997, Garrett and Barker 1987, Painter and Sias 1998, and Stebbins 2003. Information on habitat selection is found in Fitzgerald et al. 1997, Sias and Snell 1998, and Peterson and Boyd 1998. Additional general life history data are in Degenhardt et al. 1996, Degenhardt and Jones 1972, and Degenhardt and Sena 1976. Wiens and Reeder (1997) provided molecular and morphological evidence in support of the retention of *S. arenicolus* as a full species.

Large-scale habitat destruction is the major threat to the continued existence of *S. arenicolus* in southeastern New Mexico. Of the major land use practices that occur within the range of *S. arenicolus* in New Mexico, it has been established through previous studies and observations that the widespread use of herbicide for shinnery oak control and activities associated with oil/gas extraction have the greatest potential to cause significant sand dune lizard population extinction or reduction. The short-term trend of these activities is population decline; the long-term trend is unknown but increased habitat fragmentation results in increased probability of extinction of individual populations. Other activities with the potential for habitat destruction (i.e., ORV use, livestock grazing, and fire) have been little studied or are considered of lesser importance in the conservation and management of sand dune lizard populations. The following management recommendations are presented in order of importance for the conservation of the sand dune lizard.

## MANAGEMENT RECOMMENDATIONS

**Threat** : Application of herbicide (i.e., Tebuthiuron) for shinnery oak control.

**Recommendation** : All herbicide spraying for shinnery oak control within 500 m of occupied or suitable habitat should be discontinued.

**Justification** : Comparisons between Tebuthiuron treated and adjacent untreated shinnery oak habitat in the Mescalero Sands showed 70-94% reductions of *S. arenicolus* numbers in the treated pastures compared to the untreated pastures. Information on the effects of herbicide treatment on shinnery oak and *S. arenicolus* populations is found in Gorum et al. 1995, Snell et al. 1991[1992]; 1993; 1994; 1997.

Wind and other variables can cause "overdrift" or "overspray" of chemicals that are broadcast through aerial application. To prevent this "overspray" from reaching occupied habitat, buffers of at least 500 m need to be established around occupied or suitable shinnery oak habitat.

**Threat** : Application of herbicide (i.e., Tebuthiuron) for shinnery oak control.

**Recommendation** : Dispersal corridors of unsprayed shinnery oak flats at least 500 m wide should be retained between occupied and suitable unoccupied habitat that is separated by  $\leq 2000$  m.

**Justification** : Monitoring of pitfall traps (Painter and Fitzgerald, *unpubl. data* ) suggests the interdune, shinnery oak "flats" are important as dispersal corridors for juvenile *S. arenicolus* and for females seeking egg deposition sites. Continued monitoring will establish when these areas are the most important, and if they are used by dispersing adults as well. A minimum corridor width of 500 m was established by consensus among experts. However, some individuals queried (L.A. Fitzgerald and H.L. Snell, *pers. comm.* ) suggested that because sand dunes are a dynamic feature that move across the landscape through time it would be imprudent to consider any currently unoccupied patches of suitable habitat within the overall range or along the edge of the range as being useless to *S. arenicolus* .

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : Oil/gas well density should be limited to  $\leq 13$  wells per square mile (w/mi<sup>2</sup>).

**Justification** : Sias and Snell (1995) found a statistically significant pattern of greater numbers of *S. arenicolus* occurring at the Far Plots (200-220 m from well pad) compared to the Adjacent Plots (10-30 m) and the Intermediate Plots (50-70 m). They reported a mean 39.8% reduction in the *S. arenicolus* population density index in the Adjacent Plots when compared to the Far Plots, and a mean 38.9% reduction in the *S. arenicolus* population density index in the Intermediate Plots when compared to the Far Plots. These data provide evidence to conclude that oil and gas wells exert a localized reduction in *S. arenicolus* populations. The specific mechanisms of the observed reductions are unknown at this time (although may include habitat loss and fragmentation and H<sub>2</sub>S toxicity); however, a lower well density will result in a lower proportion of *S. arenicolus* habitat having conditions found in the Adjacent Plots, where population density of *S. arenicolus* is reduced.

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : Establishment of new oil and gas wells within complexes of suitable habitat should be limited so that total well pad density does not exceed 13 w/mi<sup>2</sup> .

**Justification** : Well density of 13.64 w/mi<sup>2</sup> results in a predicted population reduction of 25%. *Sceloporus arenicolus* were found throughout oil and gas fields, but overall population levels were 31-52% lower in oil

and gas fields compared to undeveloped areas. In areas with the highest well densities (34.36 w/mi<sup>2</sup>) regression analysis predicted a 56% decline in *S. arenicolus* population levels (Sias and Snell 1998). Large-scale reductions in this species habitat will lower the probability of continued survival of the species.

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : New oil/gas wells should not be placed in dunal areas within occupied or suitable habitat. Well sites proposed in these areas should be moved to adjacent shinnery oak flats. Where a dune complex that contains occupied or suitable habitat is large (>5 acres) and there are compelling reasons, such as Oil Conservation Division (OCD) requirements that may not be alleviated, new well pads should be located at the periphery of the complex, avoiding the center of the complex.

**Justification** : Based on long-term monitoring of the species, stable populations of *S. arenicolus* are known to occur only in blowout areas within shinnery oak habitat (Degenhardt et al. 1996; Fitzgerald et al 1997). Oil/gas wells and the associated caliche roads and well pads remove suitable habitat and render it unsuitable for *S. arenicolus* .

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : New well pad construction should be kept to a minimum, and the working area of the pad should be minimized. Abandoned well pads and the caliche roads that serve these wells should be cleaned of caliche, raked, contoured, and reclaimed with native sand. All out-of-service roads in occupied and suitable habitat should be reclaimed and closed to vehicle or ORV use. Abandoned well pads and out-of-service roads should not be reseeded in dunal areas. BLM should identify ways to redistribute or stockpile caliche for future road maintenance or other uses.

**Justification** : Adherence to these recommendations will minimize habitat loss.

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : The use of "thumper trucks" for oil and gas exploration in occupied and adjacent suitable habitat should not occur.

**Justification** : Being poikilothermic (often referred to as "cold-blooded"), *S. arenicolus* hibernates during colder temperatures (generally October - April). During hibernation or seasons of inactivity, they are immobile and unable to move about to escape "predation". Use of "thumper trucks" in occupied habitat during these periods of inactivity could result in direct take of sand dune lizards. Direct take could also occur during summer months when sand dune lizards are laying eggs in underground nests that could be crushed.

**Threat** : Oil/gas exploration and extraction activities.

**Recommendation** : Control measures to minimize or reduce H<sub>2</sub>S emissions should be implemented at all well sites. Laboratory and field studies designed to identify and investigate the impacts of H<sub>2</sub>S emissions should be implemented.

**Justification** : H<sub>2</sub>S emissions are known to be toxic to wildlife, although these effects on *S. arenicolus* are unknown. Until these potential effects to *S. arenicolus* populations can be quantified and further understood, it is prudent to control or reduce these emissions.

**Threat** : Oil/gas facilities maintenance and operation activities.

**Recommendation** : Regular pipeline inspection and routine maintenance of wells should occur. Oil and gas wells and storage facilities should include safety measures to ensure operations that minimize the potential for habitat pollution in the form of oil leaks or spills. Such measures should include but not be limited to replacement of worn or out-of-date materials and equipment, construction of spill containment structures, removal of contaminated materials, and minimization of vandalism.

**Justification** : Regular inspection and maintenance of wells and storage facilities will minimize possible oil/gas well pollution. Although expected to be minimal, the effects of oil/gas field pollution on sand dune lizards have not been quantified, but control or reduction (at least to the extent required to address human health and safety concerns) of this pollution would be prudent to alleviate potential threats.

**Threat** : Lack of public awareness of the conservation and management needs of the sand dune lizard.

**Recommendation** : BLM, NMDGF, and USFWS should develop a public awareness program to help disseminate information on the habitat requirements and status of *S. arenicolus*. Representatives of the ranching community and the oil/gas industry should be well informed about this program, and can help to disseminate this information to others within those industries.

**Justification** : An accurate and unbiased compilation of the management needs of *S. arenicolus* would help the public and industry understand the regulations and laws governing management by the federal and state wildlife management agencies, and to proactively preclude adverse impacts to *S. arenicolus* and its habitat.

**Threat** : ORV use.

**Recommendation** : ORV use in occupied or suitable habitat should be limited to currently established ORV recreational areas and no new ORV recreational areas should be established within sandy areas within the geographic range of sand dune lizard. ORV use should be allowed for necessary ranching or oil/gas activities.

**Justification** : Heavy recreational ORV use in arid land dunes is known to be injurious to wildlife and its habitat (Bury and Luckenbach 1983), and has been specifically identified as one of the primary threats to other species of dune-endemic lizard species (e.g., fringe-toed lizards).

**Threat** : Livestock use.

**Recommendation** : Research should be designed and implemented to study the potential impacts of livestock grazing on *S. arenicolus* and its habitat. BLM, the ranching community, and NMDGF should cooperate on designing and implementing these studies.

**Justification** : Virtually nothing is known about the potential direct impacts of livestock grazing on *S. arenicolus* and its habitat, therefore it is prudent to implement this research to determine at what level, if any, that negative impacts exist.

**Threat** : Use of management-ignited fires or wildfires.

**Recommendation** : Research should be designed and implemented to study the potential impacts of management-ignited fires or wildfires on *S. arenicolus* and its habitat. BLM, the ranching community, and NMDGF should cooperate on designing and implementing these studies.

**Justification** : Virtually nothing is known about the potential direct impacts of management-ignited fires or wildfires on *S. arenicolus* and its habitat, therefore it is prudent to implement this research to determine at what level, if any, that negative impacts exist.

#### LITERATURE CITED

Axtell, R.W. 1988. *Sceloporus graciosus* . In Interpretive Atlas of Texas Lizards. 5:1-4. Privately printed. Southern Illinois University, Edwardsville.

Bury, R.B. and R.A. Luckenbach. 1983. Vehicular recreation in arid land dunes: biotic responses and management alternatives. Pp. 207-221 in Webb and Wilshire (eds.). Environmental effects of off-road vehicles. Impacts and management in arid regions. Springer-Verlag, New York. 534 pp.

Censky, E.J. 1986. *Sceloporus graciosus* . Cat. Amer. Amphib. Rept.:386.1-386.4.

Cole, C.J. 1975. Karyotype and systematic status of the sand dune lizard ( *Sceloporus graciosus arenicolous* ) of the American Southwest. Herpetologica 31:288-298.

Conant, R. and J.T. Collins. 1991. A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Third Ed. Houghton Mifflin Co., Boston. xviii + 450 pp.

Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and Reptiles of New Mexico. Univ. New Mexico Press, Albuquerque. 431 pp.

Degenhardt, W.G. and A.P. Sena. 1976. Report on the endangered sand dune lizard (Sagebrush) lizard, *Sceloporus graciosus arenicolous*, in southeastern New Mexico. A report submitted to New Mexico Department of Game and Fish.

Degenhardt, W.G. and K.R. Jones. 1972. A new sagebrush lizard, *Sceloporus graciosus*, from New Mexico and Texas. *Herpetologica* 28(3):212-217.

Dixon, J.R. 1987. Amphibians and Reptiles of Texas With Keys, Taxonomic Synopses, Bibliography and Distribution Maps. Texas A&M Univ. Press. College Station. xii + 434 pp.

Garrett, J.M. and D.G. Barker. 1987. A Field Guide to Reptiles and Amphibians of Texas. Austin. Texas Monthly Press. xi + 225.

Fitzgerald, L.A., C.W. Painter, D.S. Sias, and H.L. Snell. 1997. The range, distribution and habitat of *Sceloporus arenicolus* in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM. Contract #80-516.6-01. 31 pp.

Gorum, L.W., H.L. Snell, L.J.S. Pierce, and T.J. McBride. 1995. Results from the fourth year (1994) research on the effect of shinnery oak removal on the dune sagebrush lizard, *Sceloporus arenicolus*, in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM. Contract #80-516.6-01. 12 pp.

Painter, C.W. and D.S. Sias. (1998). Geographic Distribution. *Sceloporus arenicolus*. *Herpetol. Rev.* 29(1):52.

Peterson, R.S. and C.S. Boyd. 1998. Ecology and management of sand shinnery communities: a literature review. Gen. Tech. Rept. RMRS-GTR-16. 44 pp.

Sias, D.S. and H.L. Snell. 1996. The dunes sagebrush lizard *Sceloporus arenicolus* and sympatric reptile species in the vicinity of oil and gas wells in southeastern New Mexico. Final Report for 1995 field studies. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 32 pp.

Sias, D.S. and H.L. Snell. 1998. The sand dune lizard *Sceloporus arenicolus* and oil and gas development in southeastern New Mexico. Final Report of field studies 1995-1997. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 27 pp.

Snell, H.L. and A. Landwer. 1991[1992]. Results of preliminary research on the effect of shinnery oak removal on the sand dune lizard, *Sceloporus graciosus arenicolous* , in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 8 pp.

Snell, H.L., L.W. Gorum, L.J.S. Pierce, and K.W. Ward. 1997. Results from the fifth year (1995) research on the effect of shinnery oak removal on populations of sand dune lizards, *Sceloporus arenicolus* , in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 13 pp.

Snell, H.L., L.W. Gorum, M.W. Doles, and C.K. Anderson. 1994. Results from the third years (1993) research on the effect of shinnery oak removal on populations of dunes sagebrush lizard, *Sceloporus arenicolus* , in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 13 pp.

Snell, H.L., B. Gorum, and A. Landwer. 1993. Results of second years research on the effect of shinnery oak removal on the dunes sagebrush lizard, *Sceloporus arenicolous* , in New Mexico. Final Report to NM Dept. Game and Fish, Santa Fe, NM Contract #80-516.6-01. 16 pp.

Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians. 3 rd Ed. Houghton Mifflin Co., Boston. 533 pp.

Wiens, J.J. and T.W. Reeder. 1997. Phylogeny of the spiny lizards ( *Sceloporus* ) based on molecular and morphological evidence. Herpetol. Monographs 11:1-101.