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50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule To List Dunes Sagebrush Lizard; Proposed Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2010–0041; 4500030113]

RIN 1018–AV97

Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule To List Dunes Sagebrush Lizard

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule; withdrawal.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), withdraw the proposed rule to list the dunes sagebrush lizard (*Sceloporus arenicolus*) as endangered under the Endangered Species Act of 1973, as amended (Act). This withdrawal is based on our conclusion that the threats to the species as identified in the proposed rule no longer are as significant as believed at the time of the proposed rule. We base this conclusion on our analysis of current and future threats and conservation efforts. We find the best scientific and commercial data available indicate that the threats to the species and its habitat have been reduced to the point that the species does not meet the statutory definition of an endangered or threatened species. Therefore, we are withdrawing our proposal to list the species as endangered.

ADDRESSES: The withdrawal of our proposed rule, comments, and supplementary documents are available on the Internet at *http://www.regulations.gov* at Docket No. FWS–R2–ES–2010–0041. Comments and materials received, as well as supporting documentation used in the preparation of this rule, are also available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, 2105 Osuna Road NE., Albuquerque, NM 87113, (505) 346–2525, facsimile (505) 346–2542.

FOR FURTHER INFORMATION CONTACT: Wally Murphy, Field Supervisor, New Mexico Ecological Services Field Office (see **ADDRESSES** section). If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

Previous Federal Action

On December 30, 1982, we published our notice of review classifying the sand dune lizard (dunes sagebrush lizard) as a Category 2 species (47 FR 58454). Category 2 status included those taxa for which information in the Service's possession indicated that a proposed rule was possibly appropriate, but for which sufficient data on biological vulnerability and threats were not available to support a proposed rule.

Please note that we will be referring to this species throughout this finding using the currently accepted common name of dunes sagebrush lizard (Crother *et al.* 2008, p. 39).

On September 18, 1985, we published our notice of review reclassifying the dunes sagebrush lizard as a Category 3C species (50 FR 37958). Category 3C status included taxa that were considered more abundant or widespread than previously thought or not subject to identifiable threats. Species in this category were not included in our subsequent notices of review, unless their status had changed. Therefore, in our notice of review on November 21, 1991 (56 FR 58804), the dunes sagebrush lizard was not listed as a candidate species.

On November 15, 1994, our animal candidate notice of review once again included the dune sagebrush lizard as a Category 2 species (59 FR 58982), indicating that its conservation status had changed. On February 28, 1996, we published a Candidate Notice of Review (CNOR) that announced changes to the way we identify candidates for listing under the Act (61 FR 7596). In that document, we provided notice of our intent to discontinue maintaining a list of Category 2 species, and we dropped all former Category 2 species from the list. This was done in order to reduce confusion about the conservation status of those species, and to clarify that we no longer regarded them as candidate species. As a result, the dunes sagebrush lizard did not appear as a candidate in our 1996 (61 FR 7596; February 28, 1996), 1997 (62 FR 49398; September 19, 1997), or 1999 (64 FR 57534; October 25, 1999) notices of review.

In our 2001 CNOR, the dunes sagebrush lizard was placed on our candidate list with listing priority number (LPN) of 2 (66 FR 54807; October 30, 2001). Service policy (48 FR 43098, September 21, 1983) requires the assignment of an LPN to all candidate species that are warranted for listing. This listing priority system was developed to ensure that the Service has a rational system for allocating limited resources in a way that ensures that the species in greatest need of protection are the first to receive such protection. A lower LPN reflects a need for greater protection than a higher LPN. The LPN is based on the magnitude and immediacy of threats and the species' taxonomic uniqueness with a value range from 1 to 12. A listing priority number of 2 for the dunes sagebrush lizard means that the magnitude and the immediacy of the threats to the species are high. Since 2001, the species has remained on our candidate list with an LPN of 2.

On June 6, 2002, the Service received a petition from the Center for Biological Diversity to list the dunes sagebrush lizard. On June 21, 2004, the United States District Court for the District of Oregon (*Center for Biological Diversity* v. *Norton,* Civ. No. 03–1111–AA) found that our resubmitted petition findings for the southern Idaho ground squirrel, dunes sagebrush lizard, and Tahoe yellow cress, which we published as part of the CNOR on May 4, 2004 (69 FR 24876), were not sufficient. The court indicated that we did not specify what listing actions for higher priority species precluded publishing a proposed rule for these three species, and that we did not adequately explain the reasons why actions for the identified species were deemed higher in priority, or why such actions resulted in the preclusion of listing actions for the southern Idaho ground squirrel, sand dune lizard, or Tahoe yellow cress. The court ordered that we publish updated findings for these species within 180 days of the order.

On December 27, 2004, the Service published its 12-month finding, which determined that listing was warranted, but precluded by higher priorities (69 FR 77167). In that finding, the species remained on the candidate list, with an LPN of 2. On December 14, 2010, we proposed the dunes sagebrush lizard for listing as endangered under the Endangered Species Act of 1973, as amended (Act) (75 FR 77801). Publication of the proposed rule opened a 60-day comment period that closed on February 14, 2011. On December 5, 2011 (76 FR 75858), the Service extended our determination on whether or not to list until June 14, 2012, due to significant scientific disagreement.

Species Information

The dunes sagebrush lizard is a small, light-brown phrynosomatid lizard (family Phrynosomatidae, genus *Sceloporus*), with a maximum snout-to-vent length of 70 millimeters (mm) (2.8 inches (in)) for females and 65 mm (2.6 in) for males (Degenhardt *et al.* 1996, p.

160). The dunes sagebrush lizard's nearest relative is the sagebrush lizard (*Sceloporus graciosus*), with the closest population occurring in northwestern New Mexico. The dunes sagebrush lizard and sagebrush lizard were isolated from each other at least 15,000 years ago during the late Pleistocene era, when suitable habitat for each species became separated by large areas of warm, dry unsuitable land (Jones and Lovich 2009, p. 200). Sabath (1960, p. 22) first described the occurrence of light-colored sagebrush lizards in southeastern New Mexico and western Texas. Kirkland L. Jones collected the type specimen for *Sceloporus graciosus arenicolus* on April 27, 1968, in eastern Chaves County, New Mexico (Degenhardt *et al.* 1996, p. 159). Degenhardt and Jones (1972, p. 213) described the dunes sagebrush lizard (*Sceloporus graciosus arenicolus*) as a subspecies of the sagebrush lizard. The dunes sagebrush lizard was elevated to a species in 1992 (Smith *et al.* 1992, pp. 42–43). Scientific publications, field guides, and professional scientific organizations all consider the dunes sagebrush lizard to be a valid species, and we concur. Much of the previous literature concerning *Sceloporus arenicolus* refers to it by the common name of sand dune lizard (e.g., Degenhardt *et al.* 1996, p. 159); however, the currently accepted common name is dunes sagebrush lizard (Crother *et al.* 2008, p. 39).

Habitat and Ecology

The dunes sagebrush lizard is only found in *Quercus havardii* (shinnery oak) dune habitat, located in southeastern New Mexico and West Texas. The shinnery oak community is not spreading, and its boundaries have not changed since early surveys, suggesting that new habitat is not being created (Peterson 1992, p. 2). The dune habitat in southeastern New Mexico and western Texas, where the dunes sagebrush lizard is found, lies within a small portion of the overall shinnery oak community. During the late Pleistocene era, wind erosion of the Blackwater Draw formation along with shinnery oak encroachment formed this unique dune system. The prevailing winds blow from the southwest to the northeast, creating sand accumulation along the western edge of the Llano Estacado (a large mesa or tableland) (Muhs and Holliday 2001, p. 82). This process creates parabolic dunes (crescent-shaped dunes that are concave upwind and form in areas where there is some vegetation and a good supply of sand). In this case, the dune habitat is dependent upon the existence of shinnery oak in areas with appropriate permeable, sandy soils. The landscape created by the shinnery oak dune community is a spatially dynamic system that is altered by natural processes like wind and rain. Over time, these natural processes erode and flatten sand dunes, and new dunes form in the flats (Muhs and Holliday 2001, p. 75). Shinnery oak dune complexes can transition into shinnery oak flats, along with a mosaic of habitat types within or near the range of dunes sagebrush lizard. Landforms separating habitat may include mesquite hummocks, grasslands, and tabosa flats that are lacking shinnery oak and are dominated by *Hilaria mutica* (tabosa grass) and scattered *Prosopis glandulosa* (honey mesquite).

Shinnery oak plays a very important role in stabilizing the dunes (Muhs and Holliday 2001, p. 75). Each shinnery oak tree occurs primarily under ground, with only one-tenth of the plant standing 0.6 to 0.8 meters (m) (2 to 3 feet (ft)) above ground level. Shinnery oak trees are clonal, meaning that each plant in a clone is descended asexually from a single ancestor. One clone can cover up to 81 hectares (ha) (205 acres (ac)) and can live more than 13,000 years, although individual stems on the surface may not be that old (Peterson and Boyd 1998, p. 5). These drought-tolerant trees, with large root and stem masses and an extensive underground system of horizontal stems that extends 4.6 to 6.1 m (15 to 20 ft) below the surface, support the dynamic dune system (Peterson and Boyd 1998, p. 5). The shinnery oak dune systems of western Texas and eastern New Mexico are being stabilized to different degrees by the shinnery oak cover. In some areas where land practices and drought have caused vegetation removal and shifting sands the dunes are not as stable (Muhs and Holliday 1995, p. 198).

The connection between dunes sagebrush lizards and the shinnery oak dune system is very specific; the range of the species is closely linked to the distribution of shinnery oak dunes (Fitzgerald *et al.* 1997, p. 4), and dunes sagebrush lizards are rarely found at sites lacking shinnery oak dune habitat (Fitzgerald *et al.* 1997, p. 2), though they have occasionally been found in the shinnery oak flats adjacent to dunes. The presence of dunes sagebrush lizards is also directly linked to the quality and quantity of available shinnery oak dune habitat (Fitzgerald *et al.* 1997, p. 8; Smolensky and Fitzgerald 2011, p. 324). Shinnery oak provides structure to the dune system, provides critical shelter for the dunes sagebrush lizard's thermoregulation (regulation of body temperature), and habitat for the dunes sagebrush lizard's insect prey base, which includes ants (Order Hymenoptera, Family Formicidae); small beetles (Order Coleoptera), including lady bird beetles (Family Coccinellidae) and their larvae; crickets (Order Orthoptera); grasshoppers (Order Orthoptera); and spiders (Order Araneae) (Degenhardt *et al.* 1996, p. 160).

Within the shinnery oak dune system, dunes sagebrush lizards are found in deep, wind-hollowed depressions called blowouts. These large, steep blowouts provide habitat for thermoregulation, foraging, and predator avoidance, where dunes sagebrush lizards escape under leaf litter or loose sand during the hot part of the day and at night (Painter *et al.* 2007, p. 3). Sand grain size within these blowouts may be a limiting factor in the distribution and occurrence of the dunes sagebrush lizard within the shinnery oak dunes. Preliminary laboratory and field experiments designed to determine sand grain preference demonstrated that dunes sagebrush lizards select sites with a predominance of medium-sized sand grains and do not use finer sands (Fitzgerald *et al.* 1997, p. 6). Finer sand grain sizes are thought to limit the dunes sagebrush lizard's ability to effectively breathe when they bury themselves to avoid predators or to thermoregulate. Dunes sagebrush lizards may instead prefer sand that is suitable for burying but not too fine to prevent respiration (Fitzgerald *et al.* 1997, p. 23). Sand grain size is also important in the establishment of dune blowouts and can influence the dune structure (Fitzgerald *et al.* 1997, p. 6).

Besides the shinnery oak dunes, dunes sagebrush lizards may sometimes be found in shinnery oak flats that are adjacent to occupied dunes. These shinnery oak flats are used by females looking for nesting sites and for dispersal of recent hatchlings (Hill and Fitzgerald 2007, p. 5). Females often utilize more than one dune during the nesting season and have home range sizes of about 436 square meters (m^2) (4,693 square feet (ft^2)). The largest recorded home range is 2,799.7 m^2 (9,185.4 ft^2), which includes the movement of a tracked female from her primary home range to her nesting site (Hill and Fitzgerald 2007, p. 5). Dunes sagebrush lizards are active between March and October, and are dormant underground during the colder winter months. Mating has been observed in April and May (Sena 1985, p. 17). Females build nest chambers and lay eggs in the moist soil below the surface. Nests have been observed on west-

facing, open sand slopes with little to no vegetation, approximately 18 centimeters (cm) (7.1 in) below the sand surface (Hill and Fitzgerald 2007, p. 5). Females produce one to two clutches per year, with three to five eggs per clutch. Hatchlings appear between July and September (Hill and Fitzgerald 2007, p. 2; Sena 1985, p. 6).

New Mexico

The distribution of the dunes sagebrush lizard in New Mexico was not formally described until 1997, using the results of 169 standardized surveys conducted at 157 sites. Of the 157 sites surveyed, 72 sites were determined to be occupied by dunes sagebrush lizards (Fitzgerald 1997, p. 13). As a result of these surveys, a polygon was drawn around all occupied habitat in New Mexico. The dunes sagebrush lizard is limited to a narrow, isolated band of shinnery oak dunes between elevations of 780 and 1,400 m (2,600 and 4,600 ft) in southeastern New Mexico. Additional sites have since been located in shinnery oak dunes within or just outside of the described distribution, although no populations have been found outside of the shinnery oak dune habitat. In 2010, the range was refined to incorporate new dunes sagebrush lizard occurrences, along with soil and vegetation data. The newly described range is delineated by the outer edges of the habitat; however, not all areas within the polygon are considered habitat. For instance, areas covered by mesquite hummocks are not considered dunes sagebrush lizard habitat, though they are located within the polygon.

Since the dunes sagebrush lizard was not described until 1973, it was not considered a full species until 1992, and its range was not described until 1997, there is limited site-specific data available for this species. We do have historical records of occurrence, and limited surveys by the New Mexico Department of Game and Fish (NMDGF), the Bureau of Land Management (BLM), and various universities. The first concerted effort to survey for the dunes sagebrush lizard in New Mexico took place in 1997 when the species' distribution was first defined (Fitzgerald *et al.* 1997, p. 23). After 1997, there were no consistent surveys, and all of the sites surveyed in 1997 were not revisited until 2008 to 2011. During the 2008 to 2010 surveys, dunes sagebrush lizards were found at 63 of the sites that were defined in 1997, and were not detected at 9 sites (Painter 2010, p. 1). The BLM has also surveyed BLM land for dunes sagebrush lizards throughout the species range in New Mexico. Surveys were conducted at 45 sites within the Roswell Field Office, with 6 of the sites having dunes sagebrush lizards (BLM 2011, p. 5). Twenty dunes sagebrush lizards were also captured during surveys, but it is unclear if these captures occurred within the pitfall arrays, or at separate sites. The Carlsbad Field Office had 91 pitfall arrays, with 24 of those arrays having dunes sagebrush lizards (BLM 2011, p. 7).

Surveys for the dunes sagebrush lizard have not been consistently done. Dunes sagebrush lizard populations naturally fluctuate and can be affected by extreme weather events such as drought; therefore, single site visits may not accurately determine if a site is not occupied. Based on the limited survey results we have in our files, we cannot determine long-term trends of occupancy for this species. The Service, NMDGF, BLM, and Texas Parks and Wildlife Department, along with various universities, are working to develop consistent survey and monitoring techniques. Future surveys should incorporate detection probabilities and utilize standard survey techniques for the species, in order to more accurately compare results over time.

The known geographic range of the dunes sagebrush lizard in New Mexico extends from the San Juan Mesa in northeastern Chaves County, Roosevelt County, through eastern Eddy and southern Lea Counties (Fitzgerald *et al.* 1997, p. 23). The Mescalero Escarpment is the west side of the Llano Estacado south from San Juan Mesa, and is informally referred to as the Caprock. In New Mexico there are three genetically and geographically distinct populations of dunes sagebrush lizards: the northern population (near Kenna, New Mexico), the central population (at the Caprock Wildlife Area, north of U.S. Highway 380), and the southern population (near Loco Hills and Hobbs, New Mexico). These populations are separated from each other by geologic and ecologic landscape barriers, such as the caliche caprock of the Llano Estacado plateau, mesquite hummock landscapes, highways, roads, and oil and gas pads, that form areas of unsuitable vegetation, and lack dune structure (Chan *et al.* 2008, p. 13). These barriers have isolated the populations, and they have genetically diverged over time. The northernmost population is evolutionarily considered to be the youngest population (Chan *et al.* 2008, p. 13). The southern population is considered to be the oldest population of dunes sagebrush lizard and is genetically isolated from the central population due to the presence of the uninhabitable caliche caprock of the Llano Estacado plateau. Due to the presence of the caprock, where dunes sagebrush lizards do not occur, suitable shinnery oak dune habitat is limited to a narrow 8-kilometer (km) (4.9-mile (mi)) patch between the southern and central populations. Data from Chan *et al.* (2008, p. 10) suggest that conservation of large areas that contain a network of dune complexes is needed to maintain historical levels of connectivity, and the unique genetic qualities of the three dunes sagebrush lizard populations in New Mexico.

Texas

In Texas, the species was historically found in Andrews, Crane, Gaines, Ward, and Winkler Counties (Fitzgerald *et al.* 2011, p. 2). During 2006 and 2007, surveys were conducted to determine the distribution of the dunes sagebrush lizard in the State. Surveys were conducted at 27 sites (19 of these sites were historical localities) that contained potential dunes sagebrush lizard habitat in Andrews, Crane, Cochran, Edwards, Ward, and Winkler Counties. Dunes sagebrush lizards were found at only 3 of the 27 sites surveyed (Laurencio *et al.* 2007, p. 7). Two of the sites were in large patches of shinnery oak dunes that stretch through Ward, Winkler, and Andrews Counties. Shinnery oak dune habitat exists in north and western Crane County, but dunes sagebrush lizards were not found. One dunes sagebrush lizard was found at a site in Gaines County located within the easternmost contiguous habitat that stretches from the southernmost population in New Mexico (Laurencio *et al.* 2007, p. 11).

In 2011, a comprehensive effort was undertaken to determine the dunes sagebrush lizard's habitat and range in Texas. The shinnery oak dune habitat was delineated and 50 surveys were conducted to define the dunes sagebrush lizard's range in Texas. The mapped range in Texas includes only shinnery oak dune habitat, which represents both occupied and suitable habitat for the dunes sagebrush lizard (Fitzgerald *et al.* 2011, p. 10).

Of the 50 sites surveyed, 28 sites were occupied by dunes sagebrush lizards. Dunes sagebrush lizards were found at all 19 sites surveyed in Andrews County, and it is estimated that there are approximately 12,650 ha (31,260 ac) of suitable habitat in this county (Fitzgerald *et al.* 2011, p. 13). Even though there is a historical dunes sagebrush lizard location in Crane County, no lizards were detected in 2011 (Fitzgerald *et al.* 2011, p. 10). In Gaines County, the dunes sagebrush lizard is only known from one site that

is approximately 114 ha (281 ac) in the southwestern corner of the county. Dunes sagebrush lizards were documented at this site in 2007, so surveys were not conducted in 2011 (Fitzgerald *et al.* 2011, p. 9). In Ward County, it is estimated that there are 6,960 ha (17,198 ac) of dunes sagebrush lizard habitat. Five surveys were conducted in Ward County, outside of Monahans Sandshills State Park, with dunes sagebrush lizards detected at only one site (Fitzgerald *et al.* 2011, p. 12). Historically, dunes sagebrush lizards were only known to occur in the far northeastern corner of this county, in and near Monahans Sandhills State Park. Surveys in 2007 (Laurencio *et al.* 2007, p. 11) found no dunes sagebrush lizard in the 1,554-ha (3,840-ac) park. In 2010, the park was again surveyed, and dunes sagebrush lizards were present (Fitzgerald 2010, p. 1). It is evident that the dunes sagebrush lizard is still at the park, but the negative survey data from 2007 suggests they may be present in small numbers, and that further monitoring should be done at the park and other long-term monitoring sites. Finally, it is estimated that there are 39,789 ha (98,320 ac) of habitat in Winkler County. Out of the ten sites surveyed, eight had dunes sagebrush lizards (Fitzgerald *et al.* 2011, p. 12). Dunes sagebrush lizard populations in Texas are all on private land, including the population at Monahans Sandhills State Park, which is privately owned and leased to the State of Texas.

Summary of Comments and Recommendations

In the proposed rule published on December 14, 2010 (75 FR 77801), we requested that all interested parties submit written comments on the proposal by February 14, 2011. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in the Carlsbad Daily Argus, The Portales News Tribune, Hobbs News Sun, Midland Reporter, and Lubbock Online. We received requests for public hearings in both Texas and New Mexico. We held a public hearing in Midland, Texas, on April 27, 2011, and a second public hearing in Roswell, New Mexico, on April 28, 2011. The comment period was reopened to accept comments received during the public hearings, and was closed on May 9, 2011 (76 FR 19304; April 7, 2011). On December 5, 2011 (76 FR 75858), the Service issued a 6-month extension on the final determination to list the lizard and opened the comment period again until January 19, 2012. The comment period was then reopened on February 24, 2012 (77 FR 11061), in order for the Service to consider the Texas Conservation Plan. The final comment period closed on March 12, 2012.

During the comment period for the proposed rule, we received over 800 comment letters directly addressing the proposed listing of the dunes sagebrush lizard with endangered status. During the April 27 and April 28, 2011, public hearings, 147 individuals or organizations made comments on the proposed rule. The majority of the comments, written and stated at the public hearing, opposed the proposal based on potential economic impacts. Other comments addressed the science provided in the proposal, specifically the lack of information regarding the species in Texas. We received approximately 30 comments that supported the proposal. All substantive information provided during the comment periods has either been incorporated directly into this final determination or addressed below.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from seven knowledgeable individuals with scientific expertise that included familiarity with dunes sagebrush lizard and its habitat, biological needs, and threats. We received responses from five of the peer reviewers.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding the listing of the dunes sagebrush lizard. Peer reviewer comments are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Reviewer Comments

(1) Comment: Organisms with small geographic ranges are more susceptible to extinction than organisms with larger geographic ranges. Also, organisms with specific ecological requirements are more susceptible to extinction than organisms with more general ecological requirements. Thus, even without consideration of anthropogenic effects, the dunes sagebrush lizard warrants special consideration to ensure its persistence as a species. Unfortunately, human activity throughout the geographic range of the lizard has critically exacerbated those two components of its ecology to the point that extinction is a very real threat.

Our Response: We assessed the status of the lizard, along with the past, present, and future threats to the species. We did consider the risk of extinction in our five-factor analysis and determined that historical levels of development in dunes sagebrush lizard habitat will not continue into the future. Though human activities have caused the loss of habitat within the species' range, we have determined that this species has adequate habitat available to persist into the future, given that conservation efforts direct future development outside of shinnery oak dune habitat. While having a small geographic range and specialized habitat may make a species more susceptible to threats, we have determined the dunes sagebrush lizard does not meet the definition of an endangered or threatened species because the previous threats have been alleviated.

(2) Comment: One commenter thought the proposed rule underestimated the potential harm from solar energy development.

Our Response: We acknowledge that solar energy development may be a potential threat in the future; however, we are not aware of any permitted or planned projects within the dunes sagebrush lizard's habitat.

(3) Comment: Given that the effects of disease on the lizard are unknown, it would be more accurate for the Service to state that it cannot make a conclusion about the effects of disease, due to the lack of knowledge.

Our Response: Because of known disease and parasites within the genus *Sceloporus,* it is reasonable to assume that the dunes sagebrush lizard is also affected by disease and parasites. It is correct that we cannot make a conclusion regarding the impacts of disease or parasites, and that the effects are unknown. Based on this peer review suggestion, the *Factor C* section has been updated to reflect our understanding of disease and parasites on the dunes sagebrush lizard.

(4) Comment: The section on competition could include other competitors in addition to side-blotched lizards.

Our Response: Research has not been conducted to determine the impacts of competition with other species on the dunes sagebrush lizard. The presence of other species near and around dunes sagebrush lizard habitat, within fragmented and unfragmented areas, has anecdotally been considered competition. It is possible that other species come into areas that are no longer inhabited by dunes sagebrush lizards, or it may be that increased competition causes a reduction in dunes sagebrush lizards in an area. Competition is mentioned in Sias and

Snell's 1998 research as a potential stressor for the dunes sagebrush lizard, although no formal studies have been done. Based on this, and other peer review comments, we have updated our analysis to clarify our current understanding of competition with other lizard species. Please see *Factor E,* below, for further discussion.

(5) Comment: Another common cause of anthropogenic (human-influenced) extinctions relates to the presence of exotic or alien species. The proposed rule does not mention predation by or competition with alien species.

Our Response: We have updated our analysis to include alien species, specifically feral hogs, which have now been found within the dunes sagebrush lizard's habitat. We recognize there is potential for other alien species, though we do not have substantial information regarding these species to consider them threats to the dunes sagebrush lizard. Please see *Factor C,* below, for further discussion.

(6) Comment: The proposed rule presents a scientifically supported conclusion that the dunes sagebrush lizard is in danger of extinction, that a number of anthropogenic actions exacerbate the situation, and that existing regulatory mechanisms and actions have failed to reverse a pattern of declining populations. Listing this species as endangered is a necessary step that can improve the chances that this species will persist.

Our Response: At the time of the proposed rule, the New Mexico Conservation Agreements had little participation, and the Texas Conservation Plan had not yet been developed. After the proposal published, there was a significant increase in the number of oil and gas companies and ranchers who enrolled in the New Mexico Conservation Agreements, and the Texas Conservation Plan was signed. We have also received clarification from BLM regarding the implementation of their Special Status Species Resource Management Plan Amendment (RMPA). The conservation agreements, along with the RMPA, provide conservation measures that direct development outside of dune habitat. As a result, we have determined that the dunes sagebrush lizard no longer meets the definition of a threatened or endangered species.

(7) Comment: When talking about the range of the lizard, the Service excluded Crane County, Texas.

Our Response: We have updated the information in our final determination to include the 2011 surveys that were conducted in Texas, and now include Crane County, Texas, in the range of the species (see *Species Information,* above).

(8) Comment: One peer reviewer thought the sand grain work was poorly done, and should not form the basis for any conservation measures for the lizard.

Our Response: More information should be collected regarding sand grain size, as it is relevant to the dunes sagebrush lizard's habitat preferences; however, the work that was completed provides basic information regarding the presence of dunes sagebrush lizards. In this document, the discussion of sand grain size is limited to stating that it may be a limiting factor for this species.

(9) Comment: One peer reviewer, along with several comments from BLM, the Natural Resources Conservation Service (NRCS), the States, and the public, expressed concern with the survey methodologies and how we used the information in the proposed rule. They noted that the survey does not allow for the evaluation of trends, but only defines the status quo or decline.

Our Response: We recognize that the survey information for this species is limited and not conclusive in regard to estimating abundance or population numbers. The Service is not relying on population numbers; rather we have used the best available information about habitat loss now and into the future. In 2011, we received a report detailing comprehensive surveys that were completed in Texas. This report provided valuable information that delineated the shinnery oak dune habitat, and determined occupancy of this habitat in Texas. We also received a report documenting BLM's survey efforts in 2011, which has now been incorporated into the discussion of *Species Information,* above. Based on public, agency, and peer review comments, we have updated the information in *Species Information* regarding surveys.

(10) Comment: In the Texas section it is stated that one dunes sagebrush lizard was found in Gaines County. The peer reviewer found a large population, and states that Texas surveys have found more populations than described in the proposed rule.

Our Response: Please see comment 9. We have updated the information in *Species Information,* above, in our final determination with this information and results from the 2011 survey effort in Texas. All information for surveys in Gaines County is included in the *Species Information* section.

(11) Comment: One peer reviewer thought we placed too much emphasis on the prey base of the lizard. To the reviewer's knowledge, the prey base is not a factor in the decline of any *Sceloporus* species, and until a proper diet study is conducted, we must assume that dunes sagebrush lizards are like their close relatives in diet and will eat most any insect that is small enough that they come across.

Our Response: Shinnery oak provides the structure in which the dunes sagebrush lizard and its insect prey base feed, breed, and find shelter. In Summary of Factors Affecting the Species, below, we discuss prey base in relation to the loss of habitat because the prey base can also be threatened by the removal of shinnery oak. We believe it is relevant to discuss the prey base in the context of available vegetative cover for both the dunes sagebrush lizard and its prey.

(12) Comment: A commenter suggested that, instead of the Coachella Valley fringe-toed lizard (*Uma inornata*) comparison, an example of a *Sceloporus* species would be more appropriate. The commenter suggested using research on Florida scrub lizard (*Sceloporus woodi*), which specializes on a sand ecosystem in Florida, would be more appropriate.

Our Response: The Service has reviewed literature on the Florida scrub lizard and has incorporated a study on this species into our discussion of *The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range,* below.

(13) Comment: Leavitt's report on fragmentation should be included in the threats analysis.

Our Response: This new report (Leavitt *et al.* 2011) provides additional information regarding the long-term, landscape-level effects of oil and gas development on dunes sagebrush lizards, and confirms the results provided in the Sias and Snell (1998) report. We have now summarized this report in the discussion on Oil and Gas Development, below.

(14) Comment: Climate change could have a significant impact on the dunes sagebrush lizard. The predictions made by B. Sinervo on side-blotched lizards are dire, and dunes sagebrush lizards have an even lower tolerance for heat than side-blotched lizards.

Our Response: We agree that climate change may have an impact on dunes sagebrush lizard habitat. The New Mexico Conservation Agreements, Texas Conservation Plan, and RMPA all direct development outside of habitat, which will leave large patches of intact habitat. Large, intact patches of habitat are less susceptible to climate change and drought than smaller, more fragmented patches. However, we recognized in the proposal that the dunes sagebrush lizard

may be vulnerable to changes in climate. We also note that this does not imply that the species cannot survive natural events such as drought since the dunes sagebrush lizard evolved in an environment subject to periodic atypical weather events. Please see the discussion on Climate Change and Drought, below, for additional discussion.

(15) Comment: One peer reviewer, along with multiple public commenters, believed that the conclusion that pollution is a threat to the dunes sagebrush lizard is not well supported.

Our Response: We agree that there is no research on the direct effects of pollution on the dunes sagebrush lizard, and that the research available is based on other lizard species. We also note that the scope of this impact is highly localized, and will be minimized by the New Mexico Conservation Agreements and Texas Conservation Plan. Please see the section on Exposure to Pollutants, below, for further discussion.

Comments From States

Section 4(i) of the Act states, ''the Secretary shall submit to the State agency a written justification for his failure to adopt regulations consistent with the agency's comments or petition.'' Comments received from the State regarding the proposal to list the dunes sagebrush lizard as endangered are addressed below.

(16) Comment: County and State governments in New Mexico and Texas, along with hundreds of public commenters, submitted comments regarding the social, cultural, private-property, and economic impacts of listing the dunes sagebrush lizard. Some commenters were additionally concerned because oil and gas leases on State lands in both New Mexico and Texas provide funding for public schools.

Our Response: We acknowledge the concerns expressed by commenters, and the possible impacts that might result from listing the dunes sagebrush lizard. The Act requires that we determine whether any species is an endangered or threatened species based solely on the threats to the species as determined by a review of the best available scientific information. The Act lists five factors for evaluation: (A) The present or threatened destruction, modification, or curtailment of the range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. Considerations of a social, cultural, political, or economic nature are not part of the evaluation for listing decisions. Since comments of that nature are outside the scope of this decision we have not specifically addressed them in this rule.

(17) Comment: County and State governments in New Mexico and Texas submitted comments supporting the use of conservation agreements to conserve the dunes sagebrush lizard instead of listing it under the Act.

Our Response: The Service recognizes the importance of strong partnerships to conservation of species. However, if a species meets the definition of a threatened or endangered species under the Act, we have no discretion not to list it in deference to other ongoing conservation actions. On the other hand, if ongoing and future conservation efforts reduce or remove threats to the species to the point that the species no longer meets the definition of endangered or threatened under the Act, then listing is no longer required. We have determined that the dunes sagebrush lizard does not meet the definition of a threatened or endangered species (see *Ongoing and Future Conservation Efforts* and Summary of Factors Affecting the Species, below), due in part to the New Mexico Conservation Agreements and Texas Conservation Plan.

(18) Comment: County and State governments in New Mexico and Texas, along with public commenters, submitted comments questioning the validity of the science behind the proposal.

Our Response: In our proposed rule and final determination, we used the best available scientific information to support our analyses. Additionally, we delayed our final determination by an additional 6 months, as allowed by the Act when there is substantial disagreement regarding the sufficiency or accuracy of available data, in order to solicit information to clarify these issues. We acknowledge that the science regarding the species may be incomplete in some areas, but we must rely upon the best available scientific information to make a decision nonetheless.

(19) Comment: County and State governments in New Mexico and Texas, along with public commenters, stated that documents used in the proposed rule did not meet Information Quality Act requirements.

Our Response: We used the best available scientific information and met the standards of the Information Quality Act. The Service has established guidelines to implement the Information Quality Act. These guidelines establish Service policy and procedures for reviewing, substantiating, and correcting the quality of information it disseminates to the public. Persons affected by that information may seek and obtain, where appropriate, correction of information that they believe may be in error or otherwise not in compliance with Section 515 of the Treasury and General Government Appropriations Act of 2001 (Pub. L. 106–554, HR 5658). Section 515 is also known as the Information Quality Act (IQA). Our guidelines are posted at *http://www.fws.gov/informationquality/topics/IQAguidelines-final82307.pdf.*

(20) Comment: County and State governments in New Mexico and Texas stated concerns that the Service did not coordinate with State and local governments, and did not comply with the National Environmental Policy Act (NEPA). Several commenters noted that, in order to be in compliance with various case law, policies, or regulations, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources. Affected counties within New Mexico and Texas requested agency coordination.

Our Response: We have determined that NEPA documents need not be prepared in connection with making a decision whether to list a species as endangered or threatened under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). The Service has coordinated with the State conservation agencies to collect any information regarding the dunes sagebrush lizard. The State of New Mexico provided many of the reports used in the proposed rule. Texas Parks and Wildlife Department provided lizard survey information from 2007 that was included in the proposed rule. State and local governments have been provided with adequate opportunity to comment on the proposed rule. Multiple comment periods allowed for adequate opportunity for public comment. In addition, question and answer sessions and public hearings (with notices in the **Federal Register** and local newspapers) were held on April 27 and 28, 2011, providing another opportunity for comment submission. In addition to the comment period, we visited with commenters on several occasions to ensure that their concerns were heard and considered. In 2011, the Service met with representatives of Chaves and

Eddy Counties, and various state and local governments in Texas.

Federal Agency Comments

(21) Comment: The BLM and NRCS submitted many comments with factual corrections, or new information regarding those agencies' actions with respect to the dunes sagebrush lizard.

Our Response: We have incorporated these comments into our final determination, as appropriate. We have also included our current understanding of BLM's implementation of its Special Status Species RMPA, and of the NRCS's Technical Note 5,3 which guides herbicide treatments within dunes sagebrush lizard habitat.

(22) Comment: The BLM does not chemically treat shinnery oak. The proposed rule states that Triclopyr and Clopyralid are used to treat mesquite, but can kill shinnery oak, depending on concentrations. The BLM applies herbicides according to labels. Use of these chemicals can cause seasonal browning of shinnery oak, but the plants so affected leaf out the following spring and produce acorns.

Our Response: We are aware of one incident where the use of these chemicals damaged shinnery oak (although not permanently) within dunes sagebrush habitat. The RMPA states that the BLM will not treat shinnery oak dunes with herbicides. Three historic dunes sagebrush lizard sites were treated with Triclopyr and Clopyralid during the summer of 2010 as part of a mesquite treatment. The timing of this treatment coincided with the dunes sagebrush lizard's breeding season, and browned the oak for the duration of the summer. In 2011, researchers revisited the sites; however, due to drought conditions, none of the shinnery oak had leafed out. It is thought that the oak was not permanently affected by the treatment, and the BLM is monitoring the sites. The Service has since worked with the BLM to ensure that no dunes sagebrush lizard sites will be treated, and there are now protocols in place to ensure dunes sagebrush lizard habitat is buffered from adjacent mesquite treatments.

(23) Comment: BLM, NRCS, and public commenters stated that the habitat description and rate of habitat loss are not accurate, complete, or correctly defined.

Our Response: Based upon public comments and information provided by the BLM, NRCS, and Texas A&M University, we have updated our analysis to include our current understanding of the habitat in both New Mexico and Texas. We have specifically corrected an error in the proposed rule that stated ''In 1982, it was estimated that there was one million acres (404,686 ha) of shinnery oak dunes in New Mexico (McDaniel *et al.* 1982, p. 12). Currently, the amount of shinnery oak dune habitat is estimated to be 600,000 acres (248,811 ha), a 40 percent loss since 1982.'' This should have stated ''In 1982, it was estimated that there was one million acres (404,686 ha) of shinnery oak in New Mexico (McDaniel *et al.* 1982, p. 12). Currently, the amount of shinnery oak is estimated to be 600,000 acres (248,811 ha), a 40 percent loss since 1982.'' The reference was describing all shinnery oak and was not specific to shinnery oak dune habitat. Please see *Species Information,* above, and Summary of Factors Affecting the Species, below.

(24) Comment: BLM commented that off-highway vehicle (OHV) use drops significantly during the months of June through September, due to hot weather conditions.

Our Response: We had not considered this in our proposal, but have incorporated this discussion in the ''Off-Highway Vehicle (OHV) Use'' section regarding the lizard's potential exposure to OHV activities.

(25) Comment: BLM biologists reported no conflicts with the occupied dunes sagebrush lizard habitat at the Square Lakes OHV Area, and Mescalero Sands appears not to be habitat for the dunes sagebrush lizard. BLM remains committed to ensure that there are no conflicts with dunes sagebrush lizards, and there should be no BLM-related OHV impacts.

Our Response: We disagree that there are no impacts to dunes sagebrush lizards in the occupied OHV areas; however, these impacts (e.g., habitat degradation, collision mortality) are localized and do not threaten entire populations or the species as a whole (see Off-Highway Vehicle (OHV) Use, below). Mescalero Sands OHV Area was historically occupied, and should be resurveyed to determine if dunes sagebrush lizards are still present, though BLM's 2011 surveys did not find dunes sagebrush lizards at the site.

(26) Comment: Although 111,519 ha (275,570 ac) have been leased for oil and gas development within delineated dunes sagebrush lizard habitat, it is not guaranteed that this area will be developed.

Our Response: We agree. We understand that not all leased areas will actually be developed for oil or gas. Additionally, many leased areas are now enrolled under the New Mexico Conservation Agreements or Texas Conservation Plan, and will only be developed with the conservation measures in these agreements. Please see *Ongoing and Future Conservation Efforts* section, below.

(27) Comment: The Service does not consider the amount of habitat that is covered by conservation agreements. These agreements provide protection, reclamation, and restoration. The conservation agreements should go through an analysis under the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE) (68 FR 15100).

Our Response: When the proposed rule was published in December 2010, there were only four companies enrolled in the New Mexico Conservation Agreements, covering 20,303 ha (50,170 acres) of dunes sagebrush lizard habitat. As of May 2012, enrollment has risen to 29 companies, covering 110,893 ha (274,024 acres) of dunes sagebrush lizard habitat. Ranchers have enrolled 151,083 ha (373,335 acres) of rangeland. When combined with the New Mexico State Land Office enrollment and the application of the management restrictions on public lands under the RMPA, 95 percent of dunes sagebrush lizard habitat in New Mexico is included in areas protected by conservation efforts. On February 17, 2012, the Texas Conservation Plan was signed, and as of May 2012, 71 percent (56,105 ha (138,640 ac)) of the habitat in Texas has been enrolled in this plan. The Service has now completed a PECE analysis of the New Mexico Conservation Agreements and the Texas Conservation Plan, and information from that analysis has been incorporated into our final determination. Our PECE analysis is available at *http://www.regulations.gov.* We are withdrawing our proposal to list the species (see Summary of Factors Affecting the Species, below), due in part to these efforts.

(28) Comment: Not all parts of the dunes sagebrush lizard's range have incurred the same amount of development.

Our Response: The Service agrees that not all areas that contain dunes sagebrush lizard habitat have equal development, and currently there are areas where development is much greater than other areas. Based on public comments, information received from the BLM, and our habitat fragmentation analysis, we have updated our analysis of habitat fragmentation in both New Mexico and Texas. Please see Summary of Factors Affecting the Species, below.

(29) Comment: BLM data shows that 91.4 percent of the dunes sagebrush lizard's habitat has less than or equal to 9 percent caliche cover.

Our Response: The data provided by BLM did not include Texas. The Service digitized all of the caliche roads in both New Mexico and Texas, and found that in New Mexico, 45 percent of the habitat is currently fragmented, and 48 percent of the habitat in Texas is currently fragmented with caliche roads and pads. Please see the discussion on Oil and Gas Development, below, for more discussion.

(30) Comment: BLM's RMPA is not merely guidance, and provides protection and surface reclamation, places development out of dunes, prohibits chemical treatments in occupied or suitable habitat, provides dispersal corridors, reduces new drilling locations, decreases the size of well pads, places more than one well per pad, reclaims inactive pads and roads, reduces the number and length of roads, reduces the number of powerlines and pipelines, requires habitat surveys prior to development, limits seismic activity near dunes, places utility and rights-of-ways in common corridors, and implements best management practices for development and reclamation. The rule mischaracterizes the extent to which operators may obtain exceptions, waivers, and modifications.

Our Response: Based on comments and clarifications from BLM, we revised our analysis to reflect our current understanding of BLM's implementation of their RMPA. Please see *The Inadequacy of Existing Regulatory Mechanisms,* below, for a complete discussion of BLM's RMPA.

Public Comments

(31) Comment: Not all of the papers were peer reviewed, scientifically valid, or are specific to the dunes sagebrush lizard. One commenter specified that the use of the Sena (1985) study is not appropriate because the dissertation was never finalized.

Our Response: The report by Sena (1985) contains valuable life-history information about the dunes sagebrush lizard, which is used in various publications. In determining and evaluating threats to the dunes sagebrush lizard, we used the best scientific and commercial data available. This included articles published in peer-reviewed journals, data collected by various agencies, universities, and the Service. It is correct that some of our citations are not specific to these species or the geographic area. Nevertheless, the citations offer evidence that certain threats result in basic biological responses for similar species, and we would expect the same threat to have a similar response with the dunes sagebrush lizard.

(32) Comment: Caliche roads and pads disintegrate over time and should not be considered a threat.

Our Response: While it is true that caliche roads and pads may disintegrate over time, the calcium carbonate released from the caliche into the soil will impede plant growth, and the roads and pads will continue to affect the geologic processes that are necessary for dune formation.

(33) Comment: Disturbance creates more bare ground and edge habitat that would be beneficial to the dunes sagebrush lizard.

Our Response: The dunes sagebrush lizard lives in bare sand dune blowouts within shinnery oak dunes. The disturbed areas (roads and pads) are primarily caliche, which is a hard surface where the dunes sagebrush lizard would be unable to bury. Also, the caliche does not provide vegetative cover for the dunes sagebrush lizard to seek shelter, food, or nesting habitat.

(34) Comment: The habitats in Texas and New Mexico are different.

Our Response: Though there may be differences in the habitats in Texas and New Mexico, the dunes sagebrush lizard is found in the same habitat features: Sand dune shinnery oak blowouts. The shinnery oak sand dunes may be more or less stable in the different areas based on the amount of shinnery oak vegetation present, which can vary with land use practices and drought (Muhs and Holliday 2001, p. 75).

(35) Comment: The treatment of shinnery oak with tebuthiuron was discontinued 18 years ago. There is no evidence that dunes sagebrush lizard habitat has been treated since 1993. The Service provided an inaccurate estimate of the amount of habitat treated with tebuthiuron.

Our Response: The Service has documented that, as recently as 2009, shinnery oak dunes within the dunes sagebrush lizard's range in Roosevelt County, New Mexico, were treated with tebuthiuron (Service 2009, p. 1). After the publication of the proposed rule NRCS finalized a technical note that provided treatment buffers around shinnery oak dunes in New Mexico. However, this measure does not apply to Texas. The New Mexico Conservation Agreements and Texas Conservation Plan limit tebuthiuron treatments to areas outside of shinnery oak dune habitat for the dunes sagebrush lizard. Based upon public comments and information received from NRCS, we have updated our analysis to include our current understanding of tebuthiuron treatments in both New Mexico and Texas. Please see ''Shinnery Oak Removal'' for more discussion.

(36) Comment: One commenter questioned whether dunes sagebrush lizards return to tebuthiuron treatment areas, or if they are present in treatment areas. The commenter also asked whether shinnery oak returns to treated areas.

Our Response: The long-term monitoring site on the Caprock Wildlife Area includes a grid that is located on the edge of an old tebuthiuron treatment. The shinnery oak dunes and dunes sagebrush lizards are present at this site. In areas where the dune structure is still present and shinnery oak was not completely eradicated, dunes sagebrush lizards are still present at historically treated sites. According to recent data, these sites do not provide the necessary structure to have a self-sustaining dunes sagebrush lizard population, and are only sustained by nearby populations in good habitat (Ryburg and Fitzgerald 2011). It is estimated that shinnery oak will return in approximately 20 years (McDaniel 1980). Please see Shinnery Oak Removal, below, for more discussion.

(37) Comment: There is no evidence that the habitat is being threatened. The dunes sagebrush lizard is only found in a narrow habitat range that is not going away.

Our Response: The dunes sagebrush lizard's habitat has been fragmented and destroyed with the placement of caliche pads and roads, which do not provide the necessary elements for the dunes sagebrush lizard to feed, breed, and take shelter. Based on the enrollment in the New Mexico Conservation Agreements and the Texas Conservation Plan, the Service has determined that there are measures in place to direct future development outside of shinnery oak dunes, and also remove some existing infrastructure in both Texas and New Mexico. Please see the discussion in *Ongoing and Future Conservation Efforts,* below.

(38) Comment: Texas was not given an opportunity to participate in the candidate conservation agreement with assurances (CCAA) prior to the proposed rule.

Our Response: The candidate conservation agreement (CCA) and CCAA in New Mexico were developed with the BLM and the Center of Excellence in Hazardous Materials Management (CEHMM; the applicants), and signed in December 2008. At that time, the majority of known habitat was thought to occur in New Mexico, although the species was known from a few sites in Texas. The New Mexico Conservation Agreements were also

developed in response to threats to the lesser prairie chicken. It was not until 2011, that the Texas Comptroller's Office and the oil and gas industry in Texas began developing the Texas Conservation Plan, which was signed on February 17, 2012.

(39) Comment: Several comments stated that the shinnery oak dune system was not formed during the Pleistocene, not formed by geologic processes, and that the government planted shinnery oak in the 1970s.

Our Response: The commenters did not provide any scientific evidence to support these claims, nor does the Service have any scientific evidence to support these claims.

(40) Comment: Many comments pertained to the dunes sagebrush lizard survey information we discussed in the proposed rule, including allegations of incorrect use of the data gathered from the surveys, inconsistent methodology, and incomplete or absent survey information for much of Texas.

Our Response: The Service agrees that the history of surveys for this species is limited. The more recent surveys conducted to define the species' range were thorough and have incorporated new locations as they are found. In 2010, the habitat range was modified to include new locations, including data from BLM. This final determination also includes survey information from 2011 for both New Mexico and Texas. All of this information has been incorporated into this final determination.

(41) Comment: A hotter, drier climate would cause less dune stability and be better for the dunes sagebrush lizard.

Our Response: The effects of a hotter, drier climate on shinnery oak dune habitat are discussed in the Climate Change and Drought section, below. In summary, we agree that a hotter, drier climate can cause less dune stability in both the Monahan's Sands and Mescalero dune fields. However, this may not be beneficial to the dunes sagebrush lizard, because hotter temperatures could cause dunes sagebrush lizards to spend more time regulating their body temperature, and not searching for food and mates. A hotter, drier climate may also affect the shinnery oak, and increase habitat loss.

(42) Comment: After 70 years, there are still dunes sagebrush lizards in the oilfield. The commenter questioned whether any studies have examined the density of dunes sagebrush lizards to the age of oilfields. It seems logical that when the oil field comes in, the dunes sagebrush lizards leave, but remaining dunes sagebrush lizards become tolerant as activities decrease. The commenter questioned, given that dunes sagebrush lizards are still found at 8 ha (20 ac) spacing, whether they are threatened by oilfield development.

Our Response: Caliche pads and roads do not provide the basic requirements for the dunes sagebrush lizard to feed, breed, and shelter. They fragment the shinnery oak dune habitat, and increase predation and direct mortality. There are decreased numbers of dunes sagebrush lizards in developed areas, where habitat fragmentation decreases the species abundance. Dunes sagebrush lizards can be present in very low numbers, but this does not mean that they are thriving. Though research regarding the effects of oil and gas development on the dunes sagebrush lizard was not designed to specifically address this question, we summarize the available findings in *The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range,* below.

(43) Comment: A commenter inquired whether lizards are doing better in areas where the BLM has control.

Our Response: As part of the RMPA, BLM is responsible for establishing intervals and standards for evaluating and monitoring the measures within the plan, and determining whether the mitigation measures are satisfactory. Because the RMPA places oil and gas development up to 200 m (656 ft) out of dunes, it is anticipated that dunes sagebrush lizard habitat will be conserved.

(44) Comment: The BLM has closed drilling on 109,265 ha (270,000 acres) of habitat.

Our Response: Data provided by the BLM stated that 62,021 ha (153,257 acres) within the dunes sagebrush lizard's range in New Mexico will be closed to future leasing, and 53,657 ha (132,590 acres) are unleased and will remain unleased. This information has been updated in the *Ongoing and Future Conservation Efforts* discussion, below.

(45) Comment: The dunes sagebrush lizard is not geographically isolated, and individuals travel and breed between various populations.

Our Response: The genetic information shows that dunes sagebrush lizard populations are isolated, and there is little movement, if any, between the major populations (Chan 2008). Please see *Species Information,* above.

(46) Comment: The vast majority of pipelines are laid above ground.

Our Response: We were unable to find a data source to verify this comment.

(47) Comment: Pipelines create dispersal corridors.

Our Response: Though dunes sagebrush lizards can be found in shinnery oak dune habitat along pipelines, no research has determined if these pipelines are actually used as corridors between habitat patches. After pipelines are in place and vegetation returns, dunes sagebrush lizards are found along pipelines. It is reasonable to conclude that dunes sagebrush lizards could use a pipeline corridor between two shinnery oak dune complexes, but we do not have any documented examples of this occurring. There is potential for pipelines to lead to areas that are unsuitable habitat as well.

(48) Comment: Trenches are rarely left open for over a half mile in sandy soil because they tend to cave in.

Our Response: Open trenches, even a half mile long, can trap reptiles (including dunes sagebrush lizards) and other vertebrates. This threat can be minimized if trenches are closed quickly, or escape ramps are placed in trenches to allow animals to climb out. These and other measures are included in the BLM trench stipulation and the New Mexico Conservation Agreements (see *The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range,* below, for additional discussion.)

(49) Comment: Generations of dunes sagebrush lizards learn to adapt and thrive in altered environments.

Our Response: Although dunes sagebrush lizards persist in areas where shinnery oak dunes are adjacent to moderate oil and gas development, there have been no documented dunes sagebrush lizards outside of shinnery oak dune habitat. It is unreasonable to believe that they have adapted to conditions that do not provide areas to feed, breed, and seek shelter. The species requires shinnery oak dunes for shelter, food, and areas to lay eggs.

(50) *Comment: Sceloporus arenicolus* is not a valid species.

Our Response: The Service uses the best available information to determine if a species is valid. There is no disagreement within the scientific community as to the validity of the dunes sagebrush lizard as a species. It is considered a valid species by the Society for the Study of Amphibians and Reptiles, and the Center for North American Herpetology. It was first described as a subspecies of the sagebrush lizard (*Sceloporus graciosus*), but was determined to be a full species in 1992 (Smith *et al.* 1992, pp. 42–43). Please see *Species Information,* above, for a complete discussion of the species taxonomy.

(51) Comment: The Service received a study conducted in 2011 that did not find hydrogen sulfide or tebuthiuron in the soil at the study site, and determined that preliminary analysis

does not show threats to the dunes sagebrush lizard.

Our Response: This was a preliminary study that was not conclusive about the effects of hydrogen sulfide on the dunes sagebrush lizard. We do not expect hydrogen sulfide to be a stressor on the dunes sagebrush lizard throughout the species' range, and would only expect for the species to be exposed in areas where regular hydrogen sulfide releases occur (see Exposure to Pollutants section, below). Also, we do not have information regarding the effects of tebuthiuron on individuals. The information we do have indicates that the stressor, instead, is the impact of removing shinnery oak dune habitat. Unless tebuthiuron has recently been applied in an area, it is not expected to be found in the soil.

(52) Comment: A commenter inquired as to why critical habitat was not determinable, and thus not included in the proposed rule.

Our Response: In 2010, when we published our proposed rule, we had limited information regarding dunes sagebrush lizard habitat throughout the range, especially in Texas. Section 4(a)(3) of the Act requires the designation of critical habitat concurrently with the species' listing ''to the maximum extent prudent and determinable.'' Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Information sufficient to perform required analyses of the impacts of the designation is lacking, or

(ii) The biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat.

When critical habitat is not determinable, the Act provides for an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

In our proposed rule, we stated that we were unable to determine which areas meet the definition of critical habitat, because the location and distribution of physical and biological features that may be considered essential to the conservation of the species were not sufficiently understood at that time. Therefore, although we determined that the designation of critical habitat was prudent for the dunes sagebrush lizard, we found that critical habitat for the dunes sagebrush lizard was not determinable at that time.

(53) Comment: There were multiple scientific reviews of the proposed rule provided by various universities, oil companies, and petroleum associations. All of these reviews raised issues with both published and unpublished information used in our determination, and problems with our interpretation of the information.

Our Response: We acknowledge that the science regarding the dunes sagebrush lizard may not be complete, but we must base our decisions on the best scientific information available. Many of the comments reflected disagreement with the use of unpublished reports. Most of the scientific reviews did not present new data regarding the status of the dunes sagebrush lizard. Some of the comments reflect disagreements with published literature. In our proposed rule and final determination, we used the best available scientific information to support our decision. Any new information that was provided, such as the 2011 surveys completed in Texas and New Mexico, were incorporated into the information in *Species Information,* above.

(54) Comment: A commenter questioned whether studying the lizard contributes to its decline.

Our Response: There is no evidence that the limited research that has been conducted on the dunes sagebrush lizard throughout its range has led to population declines. Lizard populations are stable in the Caprock Wildlife Area where long-term lizard monitoring has occurred (Fitzgerald *et al.* 2011).

(55) Comment: A commenter questioned how blowing sand naturally changes the dune structure, since this habitat is not sustainable over time.

Our Response: The shinnery oak dune system relies on the natural geologic processes of wind and vegetation changes to form new dunes and shift the entire dune system. Unnatural changes to the geologic structure will alter the dune system. Shinnery oak acts to stabilize the dune structure to various degrees, and maintains the dunes sagebrush lizard's unique habitat. Please see *Species Information,* above, for further details.

(56) Comment: Soils in Texas have high sulfates with or without oil and gas activities.

Our Response: We were unable to verify this information for the shinnery oak dune habitat in Texas.

(57) Comment: Roads and well pads are actively being reclaimed throughout the species' range.

Our Response: We have included information on ongoing reclamation of caliche pads and roads in the discussions of *Ongoing and Future Conservation Efforts* and *The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range,* below.

(58) Comment: Oil and gas development in southeast New Mexico and west Texas, which has taken place for many decades and has caused habitat fragmentation, soil compaction, and destruction of the shinnery oak, have contributed to the dunes sagebrush lizard's decline.

Our Response: We agree that oil and gas activities occur within the range of the dunes sagebrush lizard, and portions of the species' range have high levels of oil and gas development. This development has led to the historic loss of vegetation, and has caused soil compaction and habitat fragmentation. However, more than 50 percent of the dunes sagebrush lizard's range is not currently fragmented with oil and gas, and the lizard has adequate habitat to persist into the future.

(59) Comment: A 2011 study out of Texas Tech University did not find that pollution is a threat to the dunes sagebrush lizard.

Our Response: The Texas Tech University study was limited in scope, and specifically stated that it was preliminary information, and that further research needs to be completed.

(60) Comment: The Service should not rely on the New Mexico Conservation Agreements, Texas Conservation Plan, and RMPA to provide adequate protections for the dunes sagebrush lizard and its habitat. The species should be listed as endangered throughout its range.

Our Response: Based on our PECE analyses of the New Mexico Conservation Agreements and Texas Conservation Plan, and our thorough review of the RMPA, we have concluded that those conservation efforts address threats throughout the range of the dunes sagebrush lizard, and are adequate to reduce the threats to the species such that it no longer meets the definition of endangered or threatened. See *Ongoing and Future Conservation Efforts,* below, for additional discussion.

(61) Comment: Recent studies have shown that the dunes sagebrush lizard's range is actually larger than previously thought. There is no evidence that the range of the dunes sagebrush lizard is shrinking.

Our Response: The NMDGF, BLM, and Texas A&M University have been conducting surveys to estimate the range of the dunes sagebrush lizard. The known range of the dunes sagebrush lizard has been refined in New Mexico, and has now been delineated in Texas (Fitzgerald *et al.* 2011, p. 10). We do not have long-term monitoring data to evaluate whether the dunes sagebrush lizard's population is increasing, stable, or declining. Still, on a gross scale, our

observations indicate that the range of the dunes sagebrush lizard is limited to the areas of shinnery oak dunes. The BLM, CEHMM, Texas A&M University, and the Service will continue to monitor the dunes sagebrush lizard's population and range as part of the New Mexico Conservation Agreements and Texas Conservation Plan.

(62) Comment: There is no compelling information that the dunes sagebrush lizard's population has been reduced.

Our Response: We have no evidence that the dunes sagebrush lizard's population is declining, as we do not have survey information that is robust enough to provide population information throughout the species' range. However, we have information that indicates the range of the lizard has declined in the past, primarily due to effects of oil and gas development and shinnery oak removal. As discussed throughout this document, we do not expect that the range of the lizard will continue to decline, primarily due to the conservation measures provided by the New Mexico Conservation Agreements, Texas Conservation Plan, and RMPA.

(63) Comment: The proposal did not discuss the role ranching plays in maintaining large tracts of dunes sagebrush lizard habitat.

Our Response: Large tracts of dunes sagebrush lizard habitat are beneficial to the persistence of the species into the future. These unfragmented shinnery oak dunes provide core habitat that is necessary for connectivity within and between populations. Sixty-nine percent (151,083 ha (373,335 ac)) of the dunes sagebrush lizard's delineated habitat in New Mexico is enrolled in New Mexico Conservation Agreements for ranching in New Mexico. Please see *Ongoing and Future Conservation Efforts and Grazing,* below, for more discussion.

(64) Comment: The proposal did not discuss what impacts listing may have on other species of concern with overlapping ranges.

Our Response: The proposed rule specifically addressed the threats to the dunes sagebrush lizard. Protection of dunes sagebrush habitat also protects habitat for other species like the lesser prairie-chicken and many other species that utilize the shinnery oak sand dune ecosystem.

(65) Comment: A commenter inquired about the results of efforts of the dunes sagebrush lizard working group.

Our Response: The dunes sagebrush lizard working group has recently produced a white paper that prioritizes research and directs management with the collaboration of scientists and agency biologists. This white paper will be used to direct management for the New Mexico Conservation Agreements and Texas Conservation Plan into the future.

(66) Comment: The proposal was only based on litigation pressure, or was politically motivated.

Our Response: The dunes sagebrush lizard became a candidate in 2001 when the Service determined that listing was warranted, but precluded by higher priority listing actions. While we ultimately agreed to publish a proposed rule pursuant to a settlement agreement, the rulemaking had previously been funded and substantial progress had already been made on the draft at the time of the agreement. The proposal was not litigation driven nor politically motivated, and was based on the threats to the species at the time of publication.

(67) Comment: Several commenters provided opinions as to the value of the conservation agreements. For example, one commenter noted that a decision to list will create a disincentive for affected property rights owners to cooperate with the Service. Other commenters opined that the New Mexico Conservation Agreements, Texas Conservation Plan, and RMPA are not regulatory and lack sufficient certainty or effectiveness to obviate the continued need for listing. Further, the Texas Conservation Plan is not reasonably certain to be implemented or effective and it does not form a basis for declining to list the dunes sagebrush lizard as endangered.

Our Response: We have completed PECE analyses for the New Mexico Conservation Agreements and Texas Conservation Plan, and have determined that there is sufficient certainty of implementation and effectiveness of the conservation efforts established by those agreements. Habitat loss is the primary threat to the species, and the New Mexico Conservation Agreements, Texas Conservation Plans, and the RMPA are all designed to reduce the threat of habitat loss. Directing development outside of dunes sagebrush lizard habitat is the foundational requirement that will protect the dunes sagebrush lizard and its habitat from future impacts; and the New Mexico Conservation Agreements, Texas Conservation Plan, and RMPA all have these foundational requirements. In addition, both Agreements include detailed plans for monitoring and reporting in the future. The Service has incorporated our PECE analyses for the agreements and a thorough description of BLM's implementation of the RMPA into the *Ongoing and Future Conservation Efforts* and *The Inadequacy of Existing Regulatory Mechanisms* discussions, below.

(68) Comment: Several commenters interpreted the Sias and Snell study to say that dunes sagebrush lizards will increase in oil and gas fields as compared to unfragmented habitat.

Our Response: The Sias and Snell (1998) report shows a significant decline in dunes sagebrush lizards in areas fragmented with oil and gas development, compared to unfragmented habitat. More recent research from Texas A&M University has verified this finding at a landscape scale (Leavitt *et al.* 2011). Though we do not know the exact mechanism driving declines in dunes sagebrush lizards adjacent to oil and gas development, we do have reliable evidence that dunes sagebrush lizards decline in these areas.

(69) Comment: A commenter suggested the lizard may be declining due to natural predation.

Our Response: There are natural predators of the dunes sagebrush lizard, such as coachwhip snakes, shrikes (birds), collared lizards, and roadrunners (birds). Some of these predators are more abundant in areas with caliche pads and roads. Dunes sagebrush lizards are more vulnerable to predation in areas with greater edge habitat and less vegetative cover to avoid predation. See *Disease or Predation,* below, for more information.

(70) Comment: Mesquite encroachment is a threat to the dunes sagebrush lizard.

Our Response: We agree. Based on comments provided by the public, BLM, and researchers in southeastern New Mexico, we have determined that there are areas where mesquite is encroaching into shinnery oak dunes, and threatens dunes sagebrush lizard habitat. The New Mexico Conservation Agreement, Texas Conservation Plan, and RMPA all address mesquite encroachment as a threat to the dunes sagebrush lizard. Please see *The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range,* below, for more information. We have completed an analysis of the New Mexico Conservation Agreements and the Texas Conservation Plan under PECE, and have concluded that the conservation efforts established by them are sufficiently certain to be implemented and effective that they reduce the threats to the species so that it does not meet the definition of endangered or threatened (see PECE analysis at *http://www.regulations.gov*).

(71) Comment: Extinction is natural.

Our Response: The Service recognizes that extinction can be natural. Extinction pressure can also be exacerbated by human-caused threats. We completed a five-factor analysis to

determine if there are threats, natural or manmade, to the dunes sagebrush lizard, such that it is in danger of extinction now or likely to become so in the foreseeable future. See Summary of Factors Affecting the Species section, below.

(72) Comment: All species are habitat specialists. This is why you do not find fish in the sand dunes.

Our Response: From an ecological perspective, the term habitat specialist refers to a species that can tolerate a relatively narrow range of environmental conditions. This contrasts with a habitat generalists which describes a species that can tolerate a relatively wide range of environmental conditions. The dunes sagebrush lizard is considered a habitat specialist in that it is only found within the shinnery oak sand dune habitat in southeastern New Mexico and western Texas. The shinnery oak sand dunes provide the necessary vegetative cover and structure for the dunes sagebrush lizard to lay eggs, seek shelter, and find prey.

(73) Comment: In 2011, Smolensky and Fitzgerald's research found that dunes sagebrush lizard habitat can have up to 9 percent caliche cover (14.4 wells per section), and still have no negative impacts to dunes sagebrush lizards. Commenters stated that this paper provides evidence that oil and gas does not cause declines in dunes sagebrush lizards.

Our Response: This research contained the above statement; however, the research was not designed to experimentally test how oil and gas may or may not be linked to declines in lizard populations. The Service met with the researchers who provided the following clarifications regarding their research and how it should be interpreted:

- The study is preliminary, with 11 sites that varied in habitat quantity and quality. Thus it was not possible to control for the influence of habitat when analyzing the effect of caliche roads and pads. The study was correlative, not experimental, and the history of the individual sites was not accounted for.
- The study showed habitat quantity and quality were correlated. The study showed encounters per unit effort for dunes sagebrush lizard was also correlated with habitat quantity.
- Total area of caliche does not account for proximity of wells to habitat areas nor the spatial configuration of roads and well pads. It did not directly address the issues of habitat fragmentation.
- The sites were chosen based on confirmed presence of dunes sagebrush lizard at the time of the visual encounter transects. Thus this study had no ability to detect if dunes sagebrush lizards had disappeared from areas where extensive habitat modification had occurred from oil and gas development.
- This study demonstrates a link between habitat quantity and quality. As such, the paper provides good evidence for support of conserving large areas of shinnery dunes.
- This paper and Smolensky and Fitzgerald (2010) provide baseline estimates of numbers of dunes sagebrush lizards. This is important because the information can be used to assess temporal trends in dunes sagebrush lizard numbers.
- The study did not find a direct effect of oil and gas development, nor did it conclude there is no such effect. The authors explained in detail that habitat area, habitat quality, and effects of surface area of caliche were intermingled. As in the first point, above, the effect of habitat quality was not separated from the effects of scale and from effects of habitat conversion to caliche.
- The study did not test if and how construction of caliche roads and well pads may impact the condition of habitat over time. When roads are built, the habitat for the dunes sagebrush lizard could possibly deteriorate because roads fragment the habitat and may, for example, facilitate encroachment of mesquite or influence maintenance of the shinnery dune topography.

(74) Comment: The regulatory options available to the BLM when permitting oil and gas development are either insufficient or are not utilized by the agency. The conflicted nature of that agency's mission, coupled with the extreme pressure exerted on its leaders by the oil and gas industry, results in a scenario where environmental concerns often take a backseat to development. Because of this regulatory inadequacy, the dunes sagebrush lizard has not been sufficiently protected by the BLM.

Our Response: We disagree. BLM voluntarily developed the RMPA and subsequent CCA in order to better manage the dunes sagebrush lizard and lesser prairie chicken habitats. BLM has provided substantial information regarding the implementation of the RMPA in all aspects of project planning. Please see the *Factor D* and *Ongoing and Future Conservation Efforts* sections for a complete discussion.

(75) Comment: There was a map of the sagebrush lizard's range on the Service Web site that covered a much larger area than was depicted in the proposal.

Our Response: An erroneous map for *Sceloporus graciousus arenicolus* was previously found in our Environmental Conservation Online System (*https://ecos.fws.gov*) which depicted a range that included much of Texas and New Mexico. The dunes sagebrush lizard is a full species, *Sceloporus arenicolus,* which is only found in southeastern New Mexico and southwest Texas. The erroneous account and map for *Sceloporus graciosus arenicolus* have since been removed. Please see the *Species Information* section, above, for a full description of the dunes sagebrush lizard and its range.

Summary of Changes From the Proposed Rule

Based upon our review of the public comments, comments from other Federal and State agencies, peer review comments, issues addressed at the public hearing, and any new relevant information that may have become available since the publication of the proposal, we reevaluated our proposed rule and made changes as appropriate. Other than minor clarifications and incorporation of additional information on the species' biology, this determination differs from the proposal by:

(1) Based on our analyses, the Service has determined that the dunes sagebrush lizard should not be listed as endangered. This document withdraws the proposed rule as published in 2010 (75 FR 77801; December 14, 2010).

(2) The Service has added the *Ongoing and Future Conservation Efforts* section prior to the Summary of Factors Affecting the Species section, below. The conservation agreements are no longer discussed in *Factor D. Inadequacy of Existing Regulatory Mechanisms,* but are included in this section.

(3) The Service completed an analysis of the amount of habitat fragmented by caliche roads, that is now included in the Summary of Factors Affecting the Species section.

Ongoing and Future Conservation Efforts

Below we review the current plans that provide conservation benefit to the dunes sagebrush lizard. We describe the significant conservation efforts that are already occurring and expected to occur in the future. We have also completed an analysis of the ongoing and future conservation efforts pursuant to our Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE) (68 FR 15100) on the New Mexico Conservation Agreements and Texas Conservation Plan.

New Mexico

After the dunes sagebrush lizard became a candidate species in 2001, a variety of conservation initiatives were put in place to conserve the dunes sagebrush lizard's habitat, while continuing oil and gas and ranching activities in the area. The document that served as the foundation for the conservation of dunes sagebrush lizard was the Collaborative Conservation Strategies for the Lesser Prairie-Chicken and the Sand Dune Lizard (dunes sagebrush lizard) in New Mexico (2005). This strategy provided the conservation framework necessary for the development of the combined Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) for the Lesser Prairie-Chicken and Sand Dune Lizard (dunes sagebrush lizard) (hereafter called New Mexico Conservation Agreements), and BLM's RMPA. These collaborative conservation efforts are now being implemented to benefit the dunes sagebrush lizard, as well as the lesser prairie-chicken (*Tympanuchus pallidicinctus*).

The first document to describe the conservation efforts developed in the conservation strategy was BLM's RMPA (see Factor D for additional discussion).

After the implementation of the RMPA, CEHMM, BLM, and the Service worked in cooperation and consultation with land owners and industry to develop the New Mexico Conservation Agreements, in order to bring about voluntary implementation of conservation measures for the lesser prairie-chicken and dunes sagebrush lizard. If either species were listed as threatened or endangered under the Act, the listing triggers both a regulatory and a conservation responsibility for Federal, State, and private landowners. These responsibilities stem from section 9 of the Act that would prohibit ''take'' (i.e., harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species. In addition to the section 9 prohibitions, Federal agencies must ensure that their actions will not jeopardize the continued existence of the listed species.

First, CEHMM, BLM, and the Service worked together for several years to develop the CCA, to bring about conservation on BLM land, and later they worked together to develop the CCAA to bring about conservation on non-Federal lands. The CCA was developed with the vision that the conservation measures would be implemented while the species were still candidates, and would be effective at conserving both species so as to preclude the need to list. This is accomplished by way of industry, landowner, and agency collaboration combining their respective resources to provide comprehensive conservation results that are demonstrable and beneficial to both species.

If either species were listed as threatened or endangered under the Act, the listing would trigger both a regulatory and a conservation responsibility for Federal, State, and private landowners. These responsibilities stem from section 9 of the Act that would prohibit ''take'' (i.e., harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species. In addition to the section 9 prohibitions, Federal agencies must ensure that their actions will not jeopardize the continued existence of the listed species. Under the CCA, participants have joined by voluntarily signing a certificate of participation (CP), and their actions have been analyzed in the Service's conference opinion on the CCA, which would be converted to a biological opinion and provide incidental take coverage should either species be listed. As such, participants in the CCA receive a high degree of certainty that additional restriction would not be placed on their otherwise legal activities.

The companion CCAA provides incentives for voluntary conservation of species-at-risk on private and State lands. Under the CCAA, a property owner voluntarily commits to implement specific conservation measures on non-Federal lands for the species by signing a certificate of inclusion (CI). Under the CCAA, if either species is listed, then private landowners receive assurances that additional restrictions would not be placed on their otherwise legal activities. Without regulatory assurances, landowners may be unwilling to initiate conservation measures for these species. In both cases, signing up under the CCA or CCAA is voluntary. Through enactment of a voluntary program, enrollees can elect to continue participation at their discretion. This translates into enrollees' prerogative to opt out if they so desire. Leaving participation, however, eliminates the programmatic safeguards that CCA and CCAA provide.

Interested CCA participants enroll their Federal mineral or surface leases through a CP, and CCAA participants enroll non-Federal mineral or surface parcels through a CI. At enrollment, the participants understand that all conservation measures are binding and each is implemented at the time when the specific conservation measures are applicable. Each surface-disturbing activity that occurs after enrollment results in a habitat conservation fee, as described in an action-specific fee schedule located in the CI or CP.

CEHMM has established a two-step review process to ensure implementation of the conservation measures. Step one consists of BLM permitting activities on public lands only according to the conservation measures listed in an enrolled company's CP. Similarly, a participant works with CEHMM to plan non-Federal activities according to conservation measures in their CI. The New Mexico Oil Conservation Division reviews all Federal and non-Federal applications for permits to drill, and posts the approved permits on their Web site. In step two, CEHMM queries the Web site weekly to determine where new well locations were permitted, and then reviews the locations on enrolled lands, either mapped or in the field, to ensure compliance with the applicable conservation measures. CEHMM then calculates the habitat conservation fee and charges the company the appropriate fees within 10 working days. For noncompliant locations, CEHMM contacts the company and negotiates changes to the project so that the conservation measures are implemented properly. Finally, BLM and participants submit data summarizing surface-disturbing activities to CEHMM for inclusion in monthly and annual reports to the Service. This process monitors all participants and ensures that development does not occur in dunes sagebrush habitat in enrolled areas.

A conservation team, including biologists from the Service, BLM, CEHMM, NMDGF, and the New Mexico State Land Office, was established to prioritize projects to be funded for dunes sagebrush lizard habitat restoration, reclamation of historical pads and roads, environmental contaminant removal, and other research leading to conservation of the dunes sagebrush lizard.

As of May 2012, there were 151,083 ha (373,335 ac) enrolled in the New Mexico Conservation Agreements under ranching agreements and 112,060 ha (276,906 ac) enrolled under mineral agreements. On March 1, 2012, the New Mexico State Land Office enrolled all State Trust lands in lesser prairie-chicken and dunes sagebrush lizard habitat in a unique CI under the CCAA. As of May 2012 in New Mexico, 83 percent of the dunes sagebrush lizard's habitat was enrolled in the New Mexico

Conservation Agreements. Properties may be enrolled by both the landowner for ranching activities, and by the oil or gas company for extraction activities. Including the areas that BLM has removed from leasing altogether, the area covered by the RMPA, and the area enrolled in the New Mexico Conservation Agreements, 211,708 ha (523,129 ac) have conservation measures applied to them. This is 95 percent of the total dunes sagebrush lizard habitat in New Mexico. The Service has completed a PECE analysis on the New Mexico Conservation Agreements, and it is available for review at *http://www.regulations.gov.*

Texas

A conservation plan has been developed for dunes sagebrush lizard habitat in Texas. The Texas Conservation Plan was developed and approved after the publication of the proposed rule to list the dunes sagebrush lizard. It was developed in conjunction with the Texas Comptroller's Office (the permittee) and many stakeholders, including Federal, State, and private partners representing interests in the natural resource, oil and gas, ranching, and agricultural industries.

The Texas Conservation Plan is structured differently than the New Mexico Conservation Agreements in its implementation of conservation measures (e.g., avoidance, minimization, and mitigation). The Texas Conservation Plan focuses on the avoidance of activities within lizard habitat that would further degrade habitat, reclamation of lizard habitat to reduce fragmentation, and, due to the presence of mesquite in Texas habitat, removal of mesquite that is encroaching into shinnery oak dunes. If avoidance of lizard habitat cannot be accomplished, the participants may adopt conservation measures that minimize habitat impacts, and as a last resort, mitigate for the loss of lizard habitat.

Each CI will be developed upon enrollment and will be unique to each site enrolled. Therefore, the overall conservation standards incorporated in each CI must work to accomplish the conservation goals of the Texas Conservation Plan while providing maximum benefit to the dunes sagebrush lizard. Though the specific conservation measures described in each CI may vary on a case-by-case basis, the Texas Conservation Plan as a whole limits the amount of habitat loss within dunes sagebrush lizard habitat to one percent in the first 3 years. As detailed in the permit and the Texas Conservation Plan, the permittee must first demonstrate avoidance and show that all appropriate minimization measures have been utilized before any habitat degradation is allowable. Then, if habitat loss is unavoidable, the permittee must secure mitigation commensurate with the impact prior to authorizing any habitat loss, and, further, that habitat loss cannot exceed one percent of the total dunes sagebrush lizard habitat in Texas over the first 3 years of implementation of the Texas Conservation Plan (2012 to 2015). After the first 3 years, the Service and the permittee will evaluate the Texas Conservation Plan's accomplishments, and analyze any habitat loss authorized by the CIs, to determine if future habitat loss (up to 10 percent) may be authorized. Total dunes sagebrush lizard habitat loss will not exceed 10 percent during the 30-year life of the Texas Conservation Plan.

The primary conservation measure limits impacts to high-quality habitat on enrolled areas. Participants work with the permittee (or third party contractor, because the Texas Comptroller's Office anticipates contracting this function out to a third party) to develop individual CIs through a process identified in Appendix F of the Texas Conservation Plan. This process involves a habitat impact assessment, discussion of conservation options under the Texas Conservation Plan, determination of mitigation needs, and development of a property-specific management plan. This is agreed upon through the signing of the CI. A participant is then responsible for proper implementation, annual and monthly reporting, and compliance monitoring (via third party contractors making post-construction site visits on behalf of the permittee). The permittee will provide regular reports to the Service and meet with the Service to determine if habitat goals are being met. The other provisions of the Texas Conservation Plan are based on the Conservation Recovery Award System and mitigation for loss of habitat (which is also monitored by a third party contractor). Though there may be some habitat impacts, habitat restoration done through the award system will offset this and have the positive effect of decreasing habitat fragmentation and providing for the long-term conservation of the species. It is required that 90 percent of the delineated habitat in Texas be avoided, and only up to 10 percent of the habitat may eventually be taken (under the stipulations described above), only if that same amount of habitat has already been created elsewhere by restoring previously developed habitat, or protecting habitat from mesquite encroachment.

As of May 2012, the Texas Conservation Plan included 91,959 ha (227,235 ac). Of that area, 56,105 ha (138,640 ac) (71 percent) are within mapped lizard habitat. Of this amount, 28,363 ha (70,087 ac) (56 percent) represent lizard habitat that is classified as occupied lizard habitat. The remaining 35,853 ha (88,595 ac) represent areas adjacent to mapped lizard habitat that may buffer or connect patches of lizard habitat. We anticipate these numbers to increase as additional CIs are signed and more detailed information on enrolled lands is provided. The Service has completed a PECE analysis on the Texas Conservation Plan, and it is available for review at *http://www.regulations.gov.*

PECE

The purpose of PECE is to ensure consistent and adequate evaluation of recently formalized conservation efforts when making listing decisions. The policy provides guidance on how to evaluate conservation efforts that have not yet been implemented or have not yet demonstrated effectiveness. The evaluation focuses on the certainty that the conservation efforts will be implemented and effectiveness of the conservation efforts. The policy presents nine criteria for evaluating the certainty of implementation and six criteria for evaluating the certainty of effectiveness for conservation efforts. These criteria are not considered comprehensive evaluation criteria. The certainty of implementation and the effectiveness of a formalized conservation effort may also depend on species-specific, habitat-specific, location-specific, and effort-specific factors. We consider all appropriate factors in evaluating formalized conservation efforts. The specific circumstances will also determine the amount of information necessary to satisfy these criteria.

To consider that a formalized conservation effort contributes to forming a basis for not listing a species, or listing a species as threatened rather than endangered, we must find that the conservation effort is sufficiently certain to be (1) Implemented, and (2) effective, so as to have contributed to the elimination or adequate reduction of one or more threats to the species identified through the section 4(a)(1) analysis. The elimination or adequate reduction of section 4(a)(1) threats may lead to a determination that the species does not meet the definition of threatened or endangered, or is threatened rather than endangered.

An agreement or plan may contain numerous conservation efforts, not all of which are sufficiently certain to be implemented and effective. Those conservation efforts that are not sufficiently certain to be implemented and effective cannot contribute to a determination that listing is unnecessary, or a determination to list as threatened rather than endangered. Regardless of the adoption of a conservation agreement or plan, however, if the best available scientific and commercial data indicate that the species meets the definition of ''endangered species'' or ''threatened species'' on the day of the listing decision, then we must proceed with appropriate rulemaking activity under section 4 of the Act. Further, it is important to note that a conservation plan is not required to have absolute certainty of implementation and effectiveness in order to contribute to a listing determination. Rather, we need to be certain that the conservation efforts will be implemented and effective such that the threats to the species are reduced or eliminated.

New Mexico Conservation Agreements—Using the criteria in PECE, we evaluated the certainty of implementation and effectiveness of the New Mexico Conservation Agreements. We have determined that the conservation efforts have a high certainty of being implemented. Our reasons for concluding that our level of certainty is high are that the level of enrollment is high (over 83 percent of lizard habitat is enrolled), the mechanism and authorities for collecting funds are in place, the process for allocating funds to support reclamation work and research in lizard habitat is in place, the monitoring and documentation of compliance with the conservation measures are in place, and monthly and annual reports are complete, and all parties have the legal authorities to carry out their responsibilities under the New Mexico Conservation Agreements. We have determined that the conservation efforts are effective at eliminating or reducing threats to the species because they direct new development and herbicide treatments outside of suitable and occupied habitat, restore habitat, and reduce fragmentation. We are confident that the efforts will continue to be implemented because we have a documented track record of compliance on all of the enrolled lands to date. In over 3 years of implementation, neither CEHMM nor the BLM have reported incidence of non-compliance with the conservation measures. Measures, such as reclamation, are placed on an implementation schedule and will be effective upon completion. Participants have sufficient incentive to remain enrolled and continue conservation of habitat for the lizard. The agreements have sufficient monthly and annual monitoring and reporting requirements to ensure that all of the conservation measures are implemented as planned, and are effective at removing threats to the lizard and its habitat. The collaboration between the Service, CEHMM, and BLM requires regular team meetings and involvement of all parties in order to implement the agreements fully. We find that the conservation efforts in the New Mexico Conservation Agreements and its implementing CIs and CPs have a high level of certainty of implementation (for those measures not already implemented) and effectiveness and can be considered as part of the basis for our final listing determination for the lizard.

Texas Conservation Plan—After review and analysis of the Texas Conservation Plan pertaining to the dunes sagebrush lizard in Texas, we have determined that the conservation effort will be effective at eliminating or reducing threats to the species, because it first avoids habitat and if necessary, limits development within suitable and occupied habitat as a priority, and it also improves and strives to restore habitat and reduces fragmentation. We are confident that the conservation effort will be implemented on enrolled acres, and the loss of habitat will be limited to 1 percent in the first 3 years of the plan, and not more than 10 percent over the 30-year life of the permit. Mitigation measures, such as habitat improvement and mesquite removal, are priorities in the plan. The agreements have sufficient monthly and annual monitoring and reporting requirements to ensure that all of the conservation measures are implemented as planned, and are effective at removing threats to the lizard and its habitat. The collaboration between the Service and other stakeholders requires regular meetings and involvement of all parties in order to implement the agreements fully. For this reason, we have determined that the Texas Conservation Plan will be implemented and effective at reducing the threats to the lizard in Texas, given that the majority (71 percent) of mapped lizard habitat in Texas has been enrolled.

As of May 2012, there are 56,105 ha (138,640 ac) of dunes sagebrush lizard habitat enrolled in the Texas Conservation Plan. Enrollees have collectively remitted approximately $773,000 in participation fees into the Habitat Protection Fund administered by the Texas Conservation Plan, all funds which cannot be used by the Texas Legislature for any other purpose.

Some of the same companies who are enrolled in the New Mexico Conservation Agreements have also either enrolled or committed to enroll acres in Texas. Two major operators, Conoco-Phillips and Bopco, are enrolled in both plans. As evidenced by the enrollment acreages and funds collected thus far, numerous other companies have submitted enrollment forms to enroll in the Texas Conservation Plan. However, due to confidentiality protections provided by the Texas Conservation Plan, those company names have not been disclosed to date. The high level of participation and compliance with the New Mexico Conservation Agreements and additional voluntary conservation efforts prescribed by the Texas Conservation Plan supports our determination that similar enrollment, implementation, and success is likely to be achieved in Texas.

The Service issued the permit to the permittee on February 17, 2012. Since then, in a short time, the permittee has enrolled significant acreages, collected funds from current enrollees, and has created and set into motion a non-profit organization to administer specific functions of the Texas Conservation Plan, including but not limited to, outreach to attract more participation. As of May 2012, the third party administrator is negotiating agreements with interested parties. It is reasonable to conclude that the enrollments will continue and dunes sagebrush lizard habitat placed under conservation through the Texas Conservation Plan will increase over time. We conclude that the Texas Conservation Plan has a high level of certainty of implementation and effectiveness, and can therefore be considered as part of the basis for our final determination for the dunes sagebrush lizard.

Our full analysis of the New Mexico Conservation Agreements and Texas Conservation Plan pursuant to PECE can be found at *http://www.regulations.gov.*

Summary of Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species if the Service determines that it is in danger of extinction or likely to become so due to

one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Each of these factors is discussed below.

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

The dunes sagebrush lizard is a habitat specialist and is found only in shinnery oak dune habitat (Sias and Snell 1998, p. 1). Shinnery oak is considered to be a highly threatened community (Dhillion *et al.* 1994, p. 52), and the shinnery oak dune habitat is a subset of that larger community. Changes in either land management practices or climate that impact this vegetative community reduce the potential for the habitat to be available, and may destabilize the dunes within the shinnery oak dune habitat (Muhs and Holliday 2001, p. 86).

The greatest threat to the dunes sagebrush lizard is the loss of its specialized habitat, due to a variety of factors, including activities associated with oil and gas development, and herbicide treatment for range improvements. Other threats that are also expected to contribute to habitat loss, modification, or fragmentation in the future include localized OHV use, wind and solar energy development, climate change, and drought.

In addition to habitat loss, development causes habitat fragmentation that breaks up large areas of suitable habitat into smaller patches. When large habitat patches are divided into smaller patches, there is increased edge habitat and decreased interior habitat. Individuals that live near the habitat's edge have limited resources because the exterior areas do not provide adequate shade, cover, or prey. The loss of vegetation and cover along habitat edges decreases survivorship, growth, and reproduction, and also increases predation. Individuals within smaller habitat patches, with greater proportions of edge habitat, have an increased chance of mortality, because they have less of a barrier between the core patch and the habitat disturbance (Dramsted *et al.* 1996; p. 23; Jaeger *et al.* 2005, p. 329; Ingelfinger and Anderson 2004, p. 385; Delgado-Garcia *et al.* 2007, p. 2949; Ballesteros-Barrera *et al.* 2007, p. 736; Sias and Snell 1996, p. 28; Endriss *et al.* 2007, p. 320).

For most lizard species, connectivity and movement between patches could also play an important role in determining the occupancy and sustainability of each patch (Barrows and Allen 2007, p. 66). The probability of a species going extinct in local habitat patches increases with fragmentation, as the patches become more isolated from each other (Dramstad *et al.* 1996, pp. 20–24).

We do not know how large habitat patches need to be in order to maintain viable populations of dunes sagebrush lizards. However, literature published on other species has shown that populations within smaller habitat patches have a greater risk of extinction than those in large habitat patches, because small patches support fewer individuals and have a higher proportion of less suitable edge habitat than more suitable interior habitat (Dramsted *et al.* 1996, pp. 20–24). For the similar sand-dwelling Coachella Valley fringe-toed lizard (*Uma inornata*), a decrease in habitat patch size resulted in an increased probability of local extinction. For isolated habitat patches to sustain fringe-toed lizard populations, patch size needed to be at least 100 ha (250 ac) (Chen *et al.* 2006, p. 28). Research on the Florida scrub lizard (*Sceloporus woodi*) found that patch size significantly influenced recruitment and survivorship, with the number of hatchlings per female doubling in the largest habitat patches (Hokit and Branch 2003, p. 61).

Based on these studies, we expect that the largest habitat patches for the dunes sagebrush lizard would support higher populations and decrease the chance of local population loss and extinction. The habitat for the dunes sagebrush lizard is currently patchy and fragmented throughout its range, and populations are not always connected by suitable habitat, due to natural geologic processes and human development (Chan *et al.* 2008, p. 10). The movement of this dynamic system could be interrupted by habitat fragmentation that would prevent the geologic processes from continually forming dunes, and potentially cause the current dune structures to collapse. Also, there is little evidence to suggest that dunes sagebrush lizards often traverse unsuitable habitat to find suitable habitat patches (Fitzgerald *et al.* 1997, p. 26).

Genetic diversity of dunes sagebrush lizard populations has historically been linked to the connectivity of the entire system (Chan *et al.* 2008, p. 10). Therefore, the fragmentation and loss of habitat can lower migration rates and genetic connectivity among remaining populations of dunes sagebrush lizards, potentially reducing genetic variability and increasing extinction risk. If dunes sagebrush lizards are unable to move between habitat patches because of natural patchiness and fragmentation, genetic connectivity will be reduced or lost, and individual populations will become vulnerable to stochastic events (Chan *et al.* 2008, p. 10).

The following activities have resulted in the loss and fragmentation of dunes sagebrush lizard habitat. Along with each activity, there is a description of the existing conservation actions that are intended to conserve the dunes sagebrush lizard and its habitat.

Oil and Gas Development

The dunes sagebrush lizard is found within the Permian Basin, which is one of the most productive oil and gas producing areas in the western United States. Over 50 percent of oil production in Texas occurs in Districts 8 and 8A (Texas oil and gas districts); these districts overlap the known geographic range of the dunes sagebrush lizard (Tarver and Dasgupta 1997, p. 3670). Within New Mexico, 70 percent of land within the range of the dunes sagebrush lizard has been leased by private entities, BLM, or the New Mexico State Land Office for oil and gas exploration and development (Service 2012, p. 1). Oil and gas activities have been linked to the reduction in dunes sagebrush lizard numbers around oil and gas wells (Sias and Snell 1998, p. 10; Leavitt *et al* 2011, p. 3).

There are various research projects regarding the effects of oil and gas development on the dunes sagebrush lizard. The first research project to investigate the potential effects of oil and gas activities on the dunes sagebrush lizard was completed in 1998 (Sias and Snell 1998). The goal of this study was to determine if there was a localized influence around wells placed within or adjacent to shinnery oak dune habitat, on the dunes sagebrush lizard. Visual surveys were conducted along transects at various distances from well sites, within dunes sagebrush lizard habitat. Surveys were only completed in areas where dunes sagebrush lizards were present, based on presence/absence surveys performed prior to this effort (Sias and Snell 1998, p. 3).

This study found a negative relationship between well density and the number of dunes sagebrush lizards present at sites (Sias and Snell 1998, p. 9). A regression analysis was completed that predicted a 25 percent decline of

dunes sagebrush lizard populations in areas where well densities were 13.64 wells per section. In addition, the study noted that dunes sagebrush lizard populations in areas with well densities of 29.82 wells per section were predicted to decline by 50 percent (Sias and Snell 1998, p. 10). The study also found that there were 39 percent fewer dunes sagebrush lizards in areas that were 80 m (260 ft) away from well pads, as compared to well pads that are greater than 190 m (620 ft) from dunes sagebrush lizard sites (Sias and Snell 1998, p. 2). This study suggests that moderate levels of oil and gas activities are not an imminent threat to the species, but high levels of continued development could result in population reductions (Sias and Snell 1998, p. 23).

In 2011, a preliminary study was published that showed habitat quantity and quality for the dunes sagebrush lizard were positively correlated. This research was done on 11 sites that varied in habitat quantity and quality, and were all occupied with dunes sagebrush lizards. This study was not designed to detect if dunes sagebrush lizards had disappeared from areas where extensive habitat modification had occurred from oil and gas development. The study showed encounters per unit effort for dunes sagebrush lizards were correlated with habitat quantity. In other words, more dunes sagebrush lizards were found in large areas of abundant habitat, regardless of whether the overall landscape was fragmented. This study did not find a direct effect of oil and gas development, nor did it conclude there is no such effect. As such, the paper provides good evidence for support of conserving large areas of shinnery dunes (Smolensky and Fitzgerald 2011, pp. 315–324).

In 2009, a study was initiated to determine how management practices affected patterns of landscape fragmentation and populations of dunes sagebrush lizards. Because the 1998 study determined that there were fewer dunes sagebrush lizards around well pads, this study was designed to determine if the same trends exist at a larger population scale (Leavitt *et al.* 2011, p. 3). The study established long-term monitoring sites in areas that are fragmented with oil and gas development, and areas that are not fragmented. Each site has pitfall grids to capture and mark dunes sagebrush lizards in each habitat type. Mark and recapture data from these grids will be used to estimate population size.

The data were collected from 27 trapping grids over 3 years, for a total of 48,600 trap days, and data collection will continue through 2012. The total number of all lizards captured in fragmented and unfragmented sites was not significantly different, but dunes sagebrush lizards were captured at much lower frequencies on fragmented grids compared to unfragmented grids (Leavitt *et al.* 2011, pp. 5–7). Four of the fragmented grids have yet to have a dunes sagebrush lizard captured on them. These grids are located at historical dunes sagebrush localities, in a highly developed oilfield between U.S. Highway 82 and NM State Highway 529, between Maljamar, New Mexico and Loco Hills, New Mexico (Leavitt *et al.* 2011, p. 7).

The three studies described above did not look closely into the causes (specific activities) of the reduced lizard populations in the vicinity of areas of oil and gas development that pose specific threats to the dunes sagebrush lizard. However, it is likely that the reduction or absence of dunes sagebrush lizards from sites adjacent to oil and gas wells has probably resulted from the cumulative effects of all of the activities associated with the development. The activities and infrastructure for oil and gas development included seismic exploration, roads, pads where well pumps and drilling rigs are placed, battery tanks, power lines, pipelines, and injection wells. Each of these specific activities is discussed below.

Caliche Pads and Roads—In the sandy soils of the dunes, it is necessary to increase the stability of the sandy surface to create roads for large equipment and trucks. Caliche (soil with high amounts of calcium carbonate) was common throughout the range of the dunes sagebrush lizard and often used to stabilize the sand. Bulldozers have been used to remove vegetation, and caliche was placed over the sand to create a road or well pad. The removal of shinnery oak dune habitat has resulted in a grid of roads and pads, pipelines, and power lines that are found at varying degrees throughout the range of the dunes sagebrush lizard.

Within the range of the dunes sagebrush lizard, there are 10,995 well sites. Each oil pad averages 0.8 to 1.2 ha (2 to 3 ac), and each gas pad averages 1.2 to 1.6 ha (3 to 4 ac) (Service 2012, p. 1). The Service has digitized all of the roads within the dunes sagebrush lizard habitat to estimate the percent of habitat that falls within 200 m (656 ft) of a road, which is the measure we used for habitat to be considered fragmented (as defined in Sias and Snell 1998). Forty-six percent of the total 301,468 ha (744,994 ac) of habitat in New Mexico and Texas are currently fragmented by roads. Forty-eight percent of the 81,509 ha (201,413 ac) of habitat in Texas (Fitzgerald *et al.* 2011, p. 10), and 45 percent of the 219,979 ha (543,581 ac) of habitat in New Mexico have been fragmented (Service 2012, p. 1).

The portions of the dunes sagebrush lizard's range where oil and gas activities were most prevalent are in the southern part of their range in New Mexico and West Texas, where the density of roads and well pads may have contributed to further separation of the southern population from the central population of dunes sagebrush lizards (Chan *et al.* 2008, p. 9). In New Mexico, this development covers an area of shinnery oak dunes measuring 8 km (5 mi) by 26 km (16 mi), between U.S. Highway 82 and U.S. Highway 62 in Lea and Eddy Counties. In this area there are 142 sections (36,780 ha (90,880 ac)) where the well pad density is greater than 13 wells per section. In the BLM's RMPA planning area, which incorporates all of the dunes sagebrush lizard's habitat on BLM land in New Mexico, approximately 100 new wells per year are to be drilled over the next 20 years (BLM 2007, p. 4.37). However, management prescriptions in the published RMPA direct that these activities will be outside of occupied dunes sagebrush lizard habitat.

The network of roads and pads throughout the shinnery oak dune habitat altered the habitat, making it difficult for shinnery oak to emerge and persist; the trees cannot grow through compacted areas, with increased calcium carbonate, or through permanently paved areas. Well pad and road construction removed shinnery oak on the surface, and further degraded the habitat by causing soil compaction. After well pads have been abandoned, shinnery oak did not reestablish unless the caliche was removed and rhizomes (horizontal underground stems) could regrow (Boyd and Bidwell 2002, p. 332). When the shinnery oak dune habitat was destroyed or fragmented by roads and pads, the resources provided by the shinnery oak were subsequently reduced, and dunes sagebrush lizard populations were subdivided into smaller and more vulnerable patches.

Hatchling and adult dunes sagebrush lizards have been found in shinnery oak flats between large dunes, suggesting that the area between the sand dunes is important for dispersal. Surveys by the BLM recorded dunes sagebrush lizards in the shinnery oak flats (Bird 2007, p. 2). In the past, oil and gas development has been directed into the shinnery oak flats and out of the dune complexes to lessen the impact to the dunes sagebrush lizard. In studies of other

lizard species where habitat is highly fragmented, lizards are limited to small habitat patches. These studies have also found increased mortality, due to collisions with vehicles, and due to inaccessibility to habitat, mates, and prey, leading to a reduction in population size and population persistence (Delgado-Garcia *et al.* 2007, p. 2949).

Based on various studies for similar lizard species, it would be expected that there have been negative impacts to dunes sagebrush lizards and their habitat as a result of roads and pads associated with oil and gas development. These impacts include soil compaction; decreased stability of microclimates; loss of habitat; decreased habitat quality; division of the ecosystem with artificial gaps; abrupt habitat edges; conversion of habitat interior to habitat edge; inhibited access to resources for foraging, breeding, nesting, predator avoidance, and thermoregulation; behavior modification; and direct mortality due to collisions (Jaeger *et al.* 2005, p. 329; Ingelfinger and Anderson 2004, p. 385; Delgado-Garcia *et al.* 2007, p. 2949; Ballesteros-Barrera *et al.* 2007, p. 736; Sias and Snell 1996, p. 28; Endriss *et al.* 2007, p. 320).

The New Mexico Conservation Agreements, RMPA, and Texas Conservation Plan all limit future development of roads and pads within the delineated habitat for the dunes sagebrush lizard. These plans also provide for removal of existing roads and pads once they become inactive in order to increase connectivity between shinnery oak dune complexes. The Service believes that the roads and pads associated with oil and gas development remove habitat and cause habitat fragmentation where they occur. However, more than 50 percent of the dunes sagebrush lizard's habitat is not fragmented (Service 2012, p. 1), and provides adequate core habitat for the dunes sagebrush lizard to feed, breed and shelter.

Pipelines—There are a variety of different pipelines throughout the oilfields. First, there are gathering lines, which range in size from 5 to 20 cm (2 to 8 in) in diameter, and are often laid on the surface. These small lines gather the oil from many wells, and connect to larger trunk lines measuring 20 to 61 cm (8 to 24 in) in diameter, which tend to be buried lines. Every oil or gas well has an associated pipeline, and a separate right-of-way for each pipeline. Buried pipelines were built by digging linear trenches that are 1 to 2 m (3 to 6 ft) deep, depending on the pipe being laid. The construction of pipelines removed vegetation, including shinnery oak. Pipelines are located throughout the range of the dunes sagebrush lizard. We believe pipelines pose a mortality risk to the dunes sagebrush lizard in areas where oil and gas infrastructure has been most dense, and may continue to be a mortality risk if oil and gas activities expand in the central and northern parts of the range of the species. The most significant stressor to the dunes sagebrush lizard associated with pipelines is the actual construction process, which removes vegetation, including shinnery oak, and also destabilizes the overall dune structure when placed in the dunes. Large equipment can crush nests and individuals hiding beneath the sand.

Another stressor has been the large open trenches that can form linear pitfall traps. There have been numerous recorded instances of reptiles and amphibians being trapped in pipeline, waterline, and telecommunication line trenches (Hawken 1951, p. 81; Anderson *et al.* 1952, p. 276). For example, in 2001, a 4.8–km (3.0–mi) long telecommunication line trench (similar in structure to pipeline trenches) on Albuquerque, New Mexico's West Mesa was monitored for trapped animals. During 23 days of monitoring, 298 reptiles and amphibians, including several lizard species, were removed from the trench (Painter 2008, p. 1). There were no escape ramps along the trench, so it was impossible for animals to escape.

During a distribution survey for dunes sagebrush lizards in July 2008, the NMDGF found an open pipeline ditch that went through State, private, and BLM land, that was determined to be out of compliance with the company's BLM permit, and occurred on land that was not enrolled in the CCA. The open ditch was approximately 1.2 m (4 ft) wide and 1.2 m (4 ft) deep, bisecting a dune complex known to be occupied with dunes sagebrush lizards. The large, open ditch had formed a pitfall trap where animals could not escape if they fell in. Though no dunes sagebrush lizards were detected in the ditch at the time of the survey, other reptiles were found in the ditch, and surveyors were concerned that dunes sagebrush lizards could easily be trapped in the ditch (Currylow *et al.* 2008, p. 1).

Once the pipelines are established, properly functioning pipelines are less of a stressor to the dunes sagebrush lizard. Some existing buried pipelines located within shinnery oak dunes provide sunken dune-like areas where dunes sagebrush lizards are found. Twenty-four percent of dunes sagebrush lizards found during BLM surveys were found along pipelines adjacent to shinnery oak dunes (Bird 2006, p. 2). Although it is not known how dunes sagebrush lizards utilize existing pipelines (Sias and Snell 1998, p. 5; Bird 2005, p. 1; Bird 2006, p. 1; Bird 2007, p. 1), the shinnery oak does reestablish in these areas, and they do provide the necessary habitat for dunes sagebrush lizards to forage and find shelter.

Since dunes sagebrush lizards can be found along pipelines, routine maintenance and potential leaks are localized stressors to the dunes sagebrush lizard. Leaks expose dunes sagebrush lizards to toxins, and routine maintenance increases the likelihood of being crushed by OHV travel along pipelines (Sias and Snell 1998, p. 3). On May 16, 2010, a pipeline burst in dunes sagebrush lizard habitat, spraying oil into the air and across the landscape (Leavitt 2010, p. 1). These spills introduce toxins and contaminants into the soil and cover surrounding vegetation. However, the stressors associated with pipelines are localized, and are more prevalent in areas where oil and gas development has been high.

Because pipelines are localized and the effects are temporary, it is not anticipated that they will have a significant impact on populations or the species as a whole. The New Mexico Conservation Agreements and Texas Conservation Plan route pipelines out of dunes sagebrush lizard habitat, and encourage the use of established corridors for pipelines to minimize disturbance each time a pipeline is established. The same conditions apply on public lands through the BLM RMPA. The New Mexico Conservation Agreements have a trench stipulation that requires that any open trench have escape ramps or biological monitors to remove any vertebrate from the trench. This conservation measure discourages open trenches near dunes sagebrush lizard habitat. The BLM and New Mexico Oil Conservation Division work with companies to prevent and quickly clean up emergency spills. The Service concludes that while pipelines may pose localized threats where they occur, the potential impact of pipelines is very small in relation to the total lizard habitat. The dunes sagebrush lizard has adequate unfragmented habitat available throughout its range such that pipelines do not pose a significant threat. Further, the conservation measures provided in the New Mexico Conservation Agreements and Texas Conservation Plan, and the conditions stipulated in the BLM RMPA will minimize any potential impacts from pipelines.

Powerlines—Like pipelines, powerlines have been located throughout the range of the dunes sagebrush lizard, and are more prevalent in areas of high oil and gas development. We believe the presence of powerlines may have increased predation to the dunes sagebrush lizard in areas where oil and gas infrastructure has been most dense, and may continue to be a stressor as oil and gas activities expand in the central and northern parts of the range of the species. Aside from the initial disturbance associated with installation and maintenance of a pole-mounted above-ground powerline, the most significant stressor to the dunes sagebrush lizard associated with powerlines is the increase of predator perches within the shinnery oak dune habitat. Increased predator perches may lead to increased predation by avian predators. Individuals that exist adjacent to powerlines likely have a greater risk of predation, and populations near powerlines may decline due to greater predation rates.

However, more than 50 percent of the dunes sagebrush lizard's habitat is not fragmented, and provides adequate core habitat for the dunes sagebrush lizard to feed, breed, and shelter without the threat of increased predation (Service 2012, p. 1). The Service concludes that while powerlines may increase predation where they occur, the potential impact of powerlines is very small in relation to the total lizard habitat. The dunes sagebrush lizard has adequate core habitat available throughout its range such that pipelines do not pose a significant threat. Further, the New Mexico Conservation Agreements and Texas Conservation Plan direct that new powerline construction be allowed only outside of shinnery oak dune habitat.

Seismic Exploration—Seismic exploration utilizes artificially induced shock waves to search for subsurface deposits of crude oil, natural gas, and minerals, and to facilitate the location of prospective drilling sites. Shock waves are typically produced by vibratory mechanisms mounted on specialized trucks known as thumper trucks that weigh approximately 60 tons. Seismic waves then reflect and refract off subsurface rock formations and travel back to acoustic receivers called geophones. The time it takes for seismic energy to return aids in the estimation of the structure and stratigraphy of subsurface formations (Pendleton *et al.* 2008, p. 1). Seismic exploration is conducted prior to the development of oil and gas fields, in order to determine the below surface availability of oil or gas and refine the placement of well pads.

Seismic exploration for oil and gas has been a periodic, localized activity that may have caused limited disturbance to the dunes sagebrush lizard and its habitat. Stressors due to seismic exploration occurred because heavy thumper trucks may have caused the destabilization of dunes by driving through dune complexes (Painter 2004, p. 4). Seismic exploration may also have posed a direct threat to the dunes sagebrush lizard. Dunes sagebrush lizards are dormant and immobile during colder winter months (October through March). If seismic exploration occurred during the winter months when dunes sagebrush lizards were dormant beneath the soil surface and unable to move, dunes sagebrush lizards may have been crushed. If the exploration occurred during the nesting season, eggs that were buried below the surface may also have been destroyed (Painter 2004, p. 4). Seismic exploration poses a localized threat for a short period of time while the trucks are crossing a given area. Because of mineral interest ownership and targeted pay zones, once an area has been surveyed, it will likely not be surveyed again.

Because seismic exploration is a localized activity that only occurs once or twice in a given area, it is not anticipated to have a significant impact on populations or the species as a whole. Seismic exploration is a precursor to future oil and gas development in an area, but it also directs development to the areas where drilling will be most productive, and may limit the amount of surface disturbance. The RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan restrict or limit seismic exploration within dunes sagebrush lizard habitat. The Service concludes that seismic activities may pose localized risk of mortality where they occur, but would not be expected to cause habitat loss or population declines, since these activities occur in only a very small part of the range. There is adequate habitat available that is not affected by seismic development, and seismic activities will not pose significant threats to the species, especially since these activities will now be managed under the RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan, which provide minimization of exposure.

Summary of Oil and Gas Activities—A 2007 report from the BLM (BLM 2007, pp. 3–16) states that reductions of dunes sagebrush lizard population sizes in New Mexico are associated with surface disturbance and removal of shinnery oak due to activities, such as oil and gas development, and the creation of roads associated with new rights-of-way. In areas with previously high levels of oil and gas development, populations have declined or have been extirpated (Leavitt *et al.* 2011, p. 7). If oil and gas development were projected to continue at the rate they occurred in the past, the likelihood of extinction for the dunes sagebrush lizard would be high. With the implementation of the New Mexico Conservation Agreements and the Texas Conservation Plan, it is not anticipated that oil and gas development will occur at the historical rates in the dunes sagebrush lizard's shinnery oak dune habitat. The New Mexico Conservation Agreements require that all development remain outside of the shinnery oak dunes and corridors between dune complexes. The Texas Conservation Plan's foundational conservation measure is to limit development to areas outside of dunes sagebrush lizard habitat, allow development only when avoidance is not feasible, and impose severe limitations on, and require implementation of offsetting conservation efforts for, such development. The New Mexico Conservation Agreements and Texas Conservation Plan have habitat restoration components that not only limit future development, but also reclaim areas that are currently fragmented with oil and gas development. Reclamation removes inactive caliche roads and pads, and associated infrastructure (power lines, pipelines, tank batteries etc.). The Service concludes that if all future oil and gas development is placed outside of the dunes sagebrush lizard's shinnery oak dune habitat, the species will have sufficient habitat to be viable into the future. As described in the section on PECE, above, the Service has concluded that there is sufficient certainty that the New Mexico Conservation Agreements and Texas Conservation Plan will continue to be implemented and will be effective to reduce the threat of habitat loss to the lizard.

Wind and Solar Energy Development

Eastern New Mexico and western Texas are highly suitable areas for wind and solar energy development. The infrastructure for wind and solar energy would cause similar habitat fragmentation as that produced by oil and gas development. Potential direct effects to the dunes sagebrush lizard from wind energy development include physical disturbance during construction and maintenance of a

project, habitat loss, and habitat fragmentation associated with the infrastructure of the project. A wind farm infrastructure typically consists of: (1) The physical disturbance around a tower; the area of a turbine workspace during construction (temporary) is usually a 45- to 60-m (150- to 200-ft) radius around the turbine and permanently a 15–m (50-ft) radius; (2) Gravel access roads linking wind turbine strings to each other and to existing roads; (3) Area for a concrete batch plant, if required; and (4) Buildings housing electrical switchgear, supervisory control and data acquisition central equipment, and maintenance facilities. Additionally, vehicle traffic to turbines over the life of the facility, expected to average 20 years, could pose a threat similar to the infrastructure of oil and gas development to the dunes sagebrush lizard. Alteration of habitat related to wind energy development could influence habitat suitability for this species; however, we are unaware of any studies at wind energy development sites that have examined these effects.

There is no specific information available to determine if wind or solar energy development is a threat to the dunes sagebrush lizard at this time, though there is concern regarding potential effects if wind and solar development were to occur in the species' habitat. More information is necessary to determine if any effects will result from specific alternative energy projects that will be located within dunes sagebrush lizard habitat. However, the BLM's RMPA states that applications to permit either solar or wind energy on public land within the RMPA planning area will not be approved unless the applicant can demonstrate, using peer-reviewed science, that there will be no negative impacts to dunes sagebrush lizards. Also, the New Mexico Conservation Agreements limit alternative energy to areas outside of dunes sagebrush lizard habitat. And while the Texas Conservation Plan does not specifically include a conservation measure managing wind development, it does limit all development activities in the dunes sagebrush lizard's habitat to no more than one percent of that habitat in the first 3 years.

Off-Highway Vehicle (OHV) Use

An OHV is any motorized vehicle capable of, or designated for, travel on or immediately over land, water, or other natural terrain. This includes motorcycles and off-highway motor bikes, all-terrain vehicles, dune buggies, snowmobiles, most four-wheel-drive automobiles, and any other civilian vehicle specifically designed for off-road travel (Ouren *et al.* 2007, p. 4). Extensive use of OHVs can cause soil compaction, reduce plant cover, and degrade habitat (Ouren *et al.* 2007, p. 4), causing the loss of basic needs including habitat for foraging, breeding, nesting, predator avoidance, and thermoregulation for lizard species (Jaeger *et al.* 2005, p. 329; Ingelfinger and Anderson 2004, p. 385; Delgado-Garcia *et al.* 2007, p. 2949; Ballesteros-Barrera *et al.* 2007, p. 736). Research in other dune systems has found that, in areas where plant cover is reduced, there are greater rates of erosion that led to dune destabilization. Routes used by OHVs formed mazes through large areas of dunes, fragmenting the habitat and reducing habitat connectivity at a landscape level (Ouren *et al.* 2007, p. 5). Studies on other lizard species have found that OHV travel also causes increased mortality due to lizard collisions with the vehicles themselves (Delgado-Garcia *et al.* 2007, p. 2949).

The presence of OHV pathways within dunes sagebrush lizard's habitat led researchers to believe that high levels of OHV activities were the cause for population losses in Texas (Laurencio *et al.* 2007, p. 10), but that is likely not the primary cause of extirpations in New Mexico (Painter 2004, p. 5). Nevertheless, OHV use has been a factor affecting the species within localized areas within the dunes sagebrush lizard's range. For example, on BLM land in New Mexico, established and planned OHV areas, such as the Square Lake Dune Complex and the Mescalero Sands North Dune OHV Area, are adjacent to, or within, habitat historically occupied by the dunes sagebrush lizard. These OHV areas were established in order to concentrate OHV within designated areas. The OHV use planned for the Square Lake Dune Complex is limited to existing roads, trails, and unvegetated dunes (BLM 2007, p. 4.45). This area is currently being used by OHVs, and BLM plans to formally designate this area for OHV use.

The Mescalero Sands North Dune OHV Area is considered an open area of more than 243 ha (600 ac), where vehicles are not restricted to designated trails (BLM 2007, p. 4.45), although this OHV area was historically occupied by dunes sagebrush lizards (Fitzgerald *et al.* 1997, Appendix 1). Authorized OHV activities have degraded shinnery oak dunes, potentially crushed dunes sagebrush lizards, and introduced weed species within the otherwise open dune blowouts. At the Mescalero Sands OHV area, dunes have multiple OHV trails, exposed shinnery oak roots, and erosion. In 2011, BLM surveyed this area and did not find dunes sagebrush lizards (BLM 2011, p. 6).

In the comments provided, BLM states that OHV activity drops off during the months of June through September, so lizards may not be exposed to this activity during the nesting season at intense rates. Off-highway vehicle use is not considered to be a significant threat to the species as a whole. We conclude that OHV use has been a localized threat with potential impacts to individual dunes sagebrush lizards and nests. Because OHV use has been a localized threat, it may have had a significant impact on populations, but not the species as a whole. The New Mexico Conservation Agreements and Texas Conservation Plan now restrict or limit OHV use within dunes sagebrush lizard habitat. Further, the BLM RMPA restricts off-road activities to just existing roads and trails and to the designated OHV areas.

Shinnery Oak Removal

Historically, shinnery oak was commonly removed for the purpose of clearing for agriculture and increasing forage for grazing. Shinnery oak is toxic to cattle when it first produces leaves in the spring, and it also competes with more palatable grasses and forbs for water and nutrients (Peterson and Boyd 1998, p. 8). Shinnery oak is also managed for the control of boll weevil (*Anthonomus grandis*), which destroys cotton crops. Boll weevils overwinter in areas where large amounts of leaf litter accumulate. Fire is used to remove leaf litter, and then tebuthiuron, an herbicide, is used to remove shinnery oak (Plains Cotton Growers 1998, pp. 2–3). Over 40,000 ha (100,000 ac) of shinnery oak in New Mexico and 400,000 ha (1,000,000 ac) of shinnery oak in Texas have been lost due to the tebuthiuron treatments and other herbicides (Peterson and Boyd 1998, p. 2).

A 5-year study was conducted to determine the effects of tebuthiuron application on the dunes sagebrush lizard. This study documented that dunes sagebrush lizards were absent at 50 percent of the previously occupied sites where treatments had occurred (Painter *et al.* 1999, p. 2). Shinnery oak removal results in dramatic reductions and extirpations of dunes sagebrush lizards (Snell *et al.* 1997, p. 8). For example, the extirpation of dunes sagebrush lizards was repeatedly confirmed by Snell *et al.* (1997, p. 1) from areas that were treated with herbicides to remove shinnery oak. Dunes sagebrush lizard numbers

dropped 70 to 94 percent in areas that were chemically treated, compared to adjacent untreated plots. Some plots experienced 100 percent population loss in areas treated with tebuthiuron. Painter *et al.* (1999, p. 38) estimated that about 24 percent of the total dunes sagebrush lizard habitat in New Mexico had been eliminated by 1999 due to herbicide treatment. In 2011, BLM surveyed some of the areas that were sprayed between 1969 and 1992, and found between one and four individual dunes sagebrush lizards at seven of the eight sites surveyed (BLM 2011, p. 6). Shinnery oak was not completely eradicated from these sites, and treated areas all had shinnery oak dune habitat present.

Habitat loss and dunes sagebrush lizard declines are not linked to the actual application of tebuthiuron, but rather to the long-term effects associated with the removal of shinnery oak habitat (Snell *et al.* 1997, p. 3). Herbicide treatment removes or reduces natural shinnery oak vegetation and creates smaller habitat patches rather than naturally occurring large expanses of shinnery oak. Habitat in which shinnery oak is removed with Tebuthiuron fails to meet the basic needs of the dunes sagebrush lizard, including foraging, breeding, nesting, predator avoidance, and thermoregulation. Habitat fragmentation has caused and will continue to cause inaccessibility to habitat, mates, and prey that could reduce the population size; threaten population persistence; and potentially cause local extirpations of dunes sagebrush lizards.

On BLM lands, the RMPA states that tebuthiuron may only be applied in shinnery oak habitat if there is a 500-m (1,600-ft) buffer around dunes, and that no chemical treatments should occur in suitable or occupied dunes sagebrush lizard habitat (BLM 2007, p. 4.22). The New Mexico Conservation Agreements and Texas Conservation Plan restrict or limit tebuthiuron application to areas outside of dunes sagebrush lizard habitat (out of the dunes and corridors between dunes). In 2011, the NRCS finalized Technical Note 53 that limits the application of tebuthiuron to areas outside of shinnery oak dunes in New Mexico.

We believe that the removal of shinnery oak with tebuthiuron was historically a significant threat to the dunes sagebrush lizard throughout its range. NRCS Technical Note 53, the New Mexico Conservation Agreements, and Texas Conservation Plan all restrict or limit the application of tebuthiuron within dunes sagebrush lizard habitat. Because of these agreements, the Service concludes that tebuthiuron treatment of shinnery oak dune habitat will not continue within the range of the dunes sagebrush lizard, or if so, it will be at a rate much less than that of historical application. Accordingly, we conclude that the threat associated with removal of shinnery oak with tebuthiuron has been reduced significantly, compared to our previous projections in our proposed rule.

Grazing

As discussed above, removal of shinnery oak to improve rangelands removes habitat for the dunes sagebrush lizard; however, there may also be direct impacts of grazing on dunes sagebrush lizards. While there has been no specific research regarding the impacts of grazing on the dunes sagebrush lizard and its habitat, dunes sagebrush lizards have been found in areas that are moderately grazed (Painter *et al.* 1999, p. 32). In shinnery oak dune habitat, high densities of livestock can lead to overutilization, and result in reduced ground cover, increased annual grasses and forbs, decreased perennial grasses, and increased erosion (Painter *et al.* 1999, p. 32). These conditions can be adverse for the dunes sagebrush lizard. Research has shown that high levels of grazing removes grasses and forbs, causes soil compaction, increases bare ground, and reduces water infiltration. These conditions could alter dune structure and decrease vegetation availability for foraging, mating, and predator avoidance (Smith *et al.* 1996, p. 1307; Castellano and Valone 2006, p. 87). While it is clear from this discussion that shinnery oak removal to improve rangeland conditions is a threat to the species, the direct impact of grazing on dunes sagebrush lizards is unknown at this time. The New Mexico Conservation Agreements include conservation measures that are focused on increasing lesser prairie-chicken habitat, and decreasing the impacts that may occur from grazing. Though we have no information that grazing has a direct impact on the dunes sagebrush lizard, the conservation measures in place for the lesser prairie-chicken will reduce any potential habitat threat that grazing may have. Sixty-nine percent, or 151,083 ha (373,335 ac), of dunes sagebrush lizard habitat in New Mexico is enrolled in either the CCA or CCAA for ranching in New Mexico. Large ranches in New Mexico and Texas provide areas of intact habitat with little or no fragmentation that benefit the dunes sagebrush lizard by creating habitat corridors and core habitat. These areas are necessary for the persistence of the species into the future.

Climate Change and Drought

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms ''climate'' and ''climate change'' are defined by the Intergovernmental Panel on Climate Change (IPCC). The term ''climate'' refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007a, p. 78). The term ''climate change'' thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007a, p. 78).

Scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has been faster since the 1950s. Examples include warming of the global climate system, and substantial increases in precipitation in some regions of the world and decreases in other regions (IPCC 2007a, p. 30; Solomon *et al.* 2007, pp. 35–54, 82–85). Results of scientific analyses presented by the IPCC show that most of the observed increase in global average temperature since the mid-20th century cannot be explained by natural variability in climate, and is ''very likely'' (defined by the IPCC as 90 percent or higher probability) due to the observed increase in greenhouse gas concentrations in the atmosphere as a result of human activities, particularly carbon dioxide emissions from use of fossil fuels (IPCC 2007a, pp. 5–6 and figures SPM.3 and SPM.4; Solomon *et al.* 2007, pp. 21–35). Further confirmation of the role of greenhouse gases comes from analyses by Huber and Knutti (2011, p. 4), who concluded it is extremely likely that approximately 75 percent of global warming since 1950 has been caused by human activities.

Scientists use a variety of climate models, which include consideration of natural processes and variability, as well as various scenarios of potential levels and timing of greenhouse gas emissions, to evaluate the causes of changes already observed and to project future changes in temperature and other climate conditions (e.g., Meehl *et al.* 2007, entire; Ganguly *et al.* 2009, pp. 11555, 15558; Prinn *et al.* 2011, pp. 527, 529). All combinations of models and emissions scenarios yield very similar projections of increases in the most common measure of climate change, average global surface temperature

(commonly known as global warming), until about 2030. Although projections of the magnitude and rate of warming differ after about 2030, the overall trajectory of all the projections is one of increased global warming through the end of this century, even for the projections based on scenarios that assume that greenhouse gas emissions will stabilize or decline. Thus, there is strong scientific support for projections that warming will continue through the 21st century, and that the magnitude and rate of change will be influenced substantially by the extent of greenhouse gas emissions (IPCC 2007a, pp. 44–45; Meehl *et al.* 2007, pp. 760–764 and 797–811; Ganguly *et al.* 2009, pp. 15555–15558; Prinn *et al.* 2011, pp. 527, 529).

Various changes in climate may have direct or indirect effects on species and their habitats. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). Identifying likely effects often involves aspects of climate change vulnerability analysis. Vulnerability refers to the degree to which a species (or system) is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the type, magnitude, and rate of climate change and variation to which a species is exposed, its sensitivity, and its adaptive capacity (IPCC 2007a, p. 89; see also Glick *et al.* 2011, pp. 19–22). There is no single method for conducting such analyses that applies to all situations (Glick *et al.* 2011, p. 3). We use our expert judgment and appropriate analytical approaches to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Globally, it has been predicted that climate change will cause a decline in lizard populations, with an estimated 40 percent of lizard populations becoming extinct by 2080 (Huey *et al.* 2010, p. 832). In a recent study in Mexico, 12 percent of 200 lizard populations went extinct due to the magnitude of warming in the spring (Huey *et al.* 2010, p. 832). For the lizard species studied, warming caused the lizards to avoid activities such as foraging or reproducing. In order to avoid becoming overheated, the lizards remained in cooler refuges. This research has shown evidence of actual extinctions of local populations linked to changes in climate in *Sceloporus* lizards (the genus of the dunes sagebrush lizard) (Sinervo *et al.* 2010, p. 894). There is no information regarding the susceptibility of dunes sagebrush lizard populations, in particular, to changes in climate. However, below we briefly discuss potential impacts on dunes sagebrush lizard habitat.

The predicted changes in climate in the desert Southwest include higher temperatures and less rainfall, and changes in storm frequency and severity (Seager *et al.* 2007, p. 1183; Saunders *et al.* 2008, p. 5). Higher temperatures and lower rainfall, as predicted by various models for the southeastern part of New Mexico, could manifest as further changes in the plant community (Seager *et al.* 2007, p. 1183). These increased temperatures could convert shinnery oak vegetation communities to communities with species such as yucca (*Yucca elata*), mesquite, and cacti (Family Cactacea). However, the climate models for the Southwest are not specific to the shinnery oak dune habitat, and potential impacts to the habitat are speculative.

Last year (2011) was one of the driest years on record, and shinnery oak did not leaf out for many months (BLM 2011, p. 10). However, shinnery oak is drought tolerant, and has survived previous periods of intense drought, including the long-term drought during the 1950s. Long-term drought may affect leaf production during dry years, reduce the fitness of individual patches of oak; however, based on its ability to persist through previous intense drought, shinnery oak may be more resilient to the effects of climate change. Because the response of shinnery oak to changes in climate is speculative, the extent or magnitude of impacts to shinnery oak as a result of future climate change is not known at this time.

If climate change results in additional habitat fragmentation, current areas of continuous core habitat will be more important to the species. It is anticipated that large contiguous stands of shinnery oak will be necessary for the system to be resilient to climate change. Larger habitat patches provide larger interior habitat with greater shade and cover, which will help the lizard better cope with any increasing temperatures. Further, good core habitat provides better resources of vegetation and prey, and has less edge habitat, which reduces risk of predation. Having larger patches intact stabilizes the size of a population, decreasing the probability of local extinctions, and will better allow populations to withstand the stress of climate change.

Though there are no immediate plans in place to remediate the potential climate change impacts on the dunes sagebrush lizard, there are efforts to decrease fragmentation and potentially increase available habitat. The RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan will limit and reduce habitat fragmentation within dunes sagebrush lizard habitat, and leave core habitat intact. The New Mexico Conservation Agreements address the dunes sagebrush lizard's potential response to climate change, while meeting multiple objectives, as described in the Service's September 2010 *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change.* Several objectives of this plan focus on reducing nonclimate change stressors to reduce the overall cumulative impacts of all stressors, and thereby reduce the number of factors limiting the continued survival of the species. The New Mexico Conservation Agreements direct companies to develop outside of suitable dune complexes and corridors linking those complexes. Another conservation measure calls for reclamation and restoration of degraded habitat. The BLM has 10,117 ha (25,000 ac) of mostly contiguous dunes sagebrush lizard habitat in their designated Area of Critical Environmental Concern set aside for the dunes sagebrush lizard and the lesser prairie-chicken. Also, BLM has 57,870 ha (132,590 ac) of habitat unleased for minerals, which also is not available for future leasing. Actions from the New Mexico Conservation Agreements and BLM public lands management result in a network of larger contiguous blocks of suitable habitat to facilitate movements in response to climate change and also create large refugia for the dunes sagebrush lizard and its habitat.

Because the delineated habitat for the dunes sagebrush lizard is oriented in a north to south band of shinnery oak dunes, it is not expected that all of the range will be equally impacted by climate change. If habitat impacts are realized in portions of the range of the lizard, climate change considerations can be included when deciding which areas are priorities for reclamation and habitat restoration, to offset negative effects of a changing climate. The agreements can also facilitate and fund mesquite removal within shinnery oak dunes as a potential result of climate change.

As is the case with all stressors that we assess, even if we conclude that a species may be affected in a negative way by one or more climate-related impacts, it does not necessarily follow that the species meets the definition of an ''endangered species'' or a ''threatened species'' under the Act. We

do not have climate models specific for the shinnery oak dunes habitat of the lizard, but when considering more general climate models for the Southwest, it is likely that the lizard will face a warmer, drier climate in the future than it has in the past. However, the adaptive management provided for in the New Mexico Conservation Agreements and Texas Conservation Plan directs that knowledge regarding climate-associated changes in environmental conditions will be used to help devise appropriate conservation measures to meet changing needs in the habitat, including additional habitat reclamation and restoration to provide larger refugia for the lizard.

Mesquite Encroachment

Though honey mesquite (*Prosopis glandulosa*) is a native plant in the southwestern United States, it has recently expanded from drainages and upland slopes, and is now common in grasslands (Golubov *et al.* 1999, p. 955). Honey mesquite is known to be an aggressive invader, and encroachment into shinnery oak dune habitat has recently been noted. Honey mesquite's invasion into shinnery oak dunes may degrade habitat for the dunes sagebrush lizards due to a variety of factors. Mesquite can spread quickly, and will fill in open blowouts that are a necessary component to dunes sagebrush lizard habitat. Mesquite grows taller than shinnery oak, and can serve as predator perches for shrikes and raptors.

Much of the habitat in Texas has mesquite encroachment into the shinnery oak dunes, as do some areas in New Mexico. The amount of shinnery oak dune habitat with mesquite encroachment has not yet been quantified, so the scope of the threat is unknown. The reduction of mesquite encroachment into shinnery oak dune habitat is a priority for the New Mexico Conservation Agreements and Texas Conservation Plan. Though mesquite encroachment may not be totally controlled, areas where it is a problem can be identified and prioritized for habitat restoration efforts.

Even though the scope of mesquite encroachment as a threat is not completely known, the RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan all have conservation or mitigation measures in place to control it as necessary. The Service believes that the funding available through BLM, the New Mexico Conservation Agreements' Conservation Fund, and the Texas Conservation Plan's Mitigation Fund, ensures that the treatment of mesquite encroachment is likely to occur throughout the range of the dunes sagebrush lizard. Because this problem has been identified as a priority for restoration efforts, the Service concludes that this threat is being addressed and alleviated, and can be minimized through conservation efforts. Without the efforts of the New Mexico Conservation Agreements, Texas Conservation Plan, and BLM's Restore New Mexico, mesquite encroachment would likely be considered a significant threat to the dunes sagebrush lizard. However, with the conservation efforts now in place, the Service concludes that mesquite encroachment does not pose a significant threat to the dunes sagebrush lizard, either now or in the future.

Summary of Factor A

Habitat specialists with limited geographic ranges, such as the dunes sagebrush lizard, are more vulnerable to habitat alterations than wide-ranging habitat generalists (Ballesteros-Barrera *et al.* 2007, p. 733). Habitat fragmentation and the overall reduction of shinnery oak dune habitat has affected survivorship, growth, and reproductive ability by increasing edge habitat and decreasing available cover. This led to smaller populations and decreased connectivity between populations (Chan *et al.* 2008, p. 9). The size of the habitat patches and suitable dune complexes will influence the probability of individual habitat patches being eliminated in this dynamic system. It is important to maintain connectivity between shinnery oak dune patches in each of the geographic areas across the dunes sagebrush lizard's known range (Chan *et al.* 2008, p. 9).

Historical removal of shinnery oak within occupied habitat posed a serious threat by generating or increasing a variety of stressors for the dunes sagebrush lizard, a species that depends on a very specialized dynamic system to survive. Shinnery oak stabilizes dunes in the short term, but overall the dunes are dynamic and slowly shifting across the landscape. Without shinnery oak, sands are not held in place, and the entire dune community is susceptible to wind erosion (Muhs and Holliday 1995, p. 198), which can threaten the long-term persistence of the species.

Due to the implementation of the New Mexico Conservation Agreements, the Texas Conservation Plan, and the RMPA, the Service does not anticipate future development to mirror the historical development that has already occurred. BLM's RMPA, the New Mexico Conservation Agreements, and the Texas Conservation Plan have identified the threats to this species, and provide conservation measures to alleviate or lessen those threats, to restore degraded habitat, and to reduce fragmentation or restore connectivity. The RMPA was developed to address sensitive species conservation concerns and to establish the minimum requirements that will be applied to all future Federal activities covered by the RMPA for both the dunes sagebrush lizard and the lesser prairie chicken (*Tympanuchus pallidicinctus*). Within New Mexico, 52 percent of the range of the dunes sagebrush lizard habitat (and 68 percent of the mineral ownership) are federally owned and are under BLM lease stipulations and the RMPA.

The RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan all restrict or limit development within the dunes sagebrush lizard's habitat. These restrictions and limitations apply to development activities related to oil and gas exploration, wind and solar power development, OHV use, grazing, and mesquite control. The majority of the delineated dunes sagebrush lizard habitat in New Mexico and Texas is covered by the RMPA, enrolled in the New Mexico Conservation Agreements, or enrolled in the Texas Conservation Plan. Also, 53,400 ha (132,590 ac) of dunes sagebrush lizard habitat is unleased, and has been permanently removed from future leasing in New Mexico. In New Mexico, 95 percent (211,703 ha (523,130 ac)) of dunes sagebrush lizard habitat is subject to conservation measures. In Texas, 71 percent (56,105 ha (138,640 ac)) is enrolled in the Texas Conservation Plan. Because of these agreements, the RMPA, and the habitat that has been removed from leasing, the Service concludes that oil and gas development will not continue within dunes sagebrush lizard habitat at historical rates. These agreements also provide funding to remove pads and roads and reduce habitat fragmentation. As part of the New Mexico Conservation Agreements' and BLM's efforts, hundreds of well pads, roads, and associated oil and gas infrastructure have been reclaimed within the lizard's range in New Mexico.

The discontinuation of habitat loss and fragmentation, and the restoration of already fragmented habitat, will have the benefit of decreasing edge habitat and increasing interior habitat. Individuals that live within core habitat will have increased resources, because the interior habitat provides adequate shade, cover, and prey. The increased vegetation and cover will lead to increased survivorship, growth, and reproduction, and also to decreased predation by species that are near roads

and on power lines. Individuals within larger habitat patches, which have smaller proportions of edge habitat, have a decreased chance of going extinct, because they have a greater barrier between the core patch and the habitat disturbance. Leaving an occupied patch intact stabilizes the size of a population, decreasing the probability of local extinctions and increasing the stability of the population (Dramsted *et al.* 1996, p. 23; Jaeger *et al.* 2005, p. 329; Ingelfinger and Anderson 2004, p. 385; Delgado-Garcia *et al.* 2007, p. 2949; Ballesteros-Barrera *et al.* 2007, p. 736; Sias and Snell 1996, p. 28; Endriss *et al.* 2007, p. 320).

The Service concludes that if future development and activities involving oil and gas exploration, wind and solar power development, OHV use, and grazing are placed outside of the dunes sagebrush lizard's habitat, and if tebuthiuron treatments are limited to areas outside of habitat, the species currently has adequate habitat to persist into the future. Currently, greater than 50 percent of the dunes sagebrush lizard's habitat is unfragmented and provides large areas of core shinnery oak dunes. These large core areas, along with the adaptive management provisions of the conservation agreements, will provide refugia to help maintain adequate habitat for the lizard with changing climatic conditions. If the RMPA and these agreements were not in place throughout the range of the species, the Service anticipates that the threats of oil and gas development and shinnery oak removal would continue at the levels of that in the past. However, with the conservation agreements, the current habitat conditions will be maintained or improved, such that we no longer find this factor to be a threat, either now or in the future.

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

The dunes sagebrush lizard is not a commercially valuable species, but could be increasingly sought by collectors due to its rarity. However, scientific collecting is not known to represent a significant threat to populations. Furthermore, the State of New Mexico requires scientific collecting and research permits for the dunes sagebrush lizard (NMDGF 1978, p. 7; TX House Bill 12, 2007). Therefore, we do not consider overutilization to be a significant threat, either currently or in the future.

C. Disease or Predation

Disease and Parasites

There are no studies on the impacts of disease or parasitism on dunes sagebrush lizards, but studies have been conducted on close relatives within the genus *Sceloporus. Sceloporus* lizards infected with malaria have reduced volumes of red blood cells, reduced hemoglobin (the protein that carries oxygen in the blood), impaired physical stamina, reduced fat stores, reduced number of offspring, and smaller testes (Klukowski and Nelson 2001, p. 289). The incidence of malaria in *Sceloporus* lizards is dependent on the lizard's age, size, genetic background, and gender (Klukowski and Nelson 2001, p. 289). Other lizards in the genus *Sceloporus* have parasitic helminthes (a type of parasitic worm) in their gut. These helminthes have not been found in high numbers in dunes sagebrush lizards (Goldberg *et al.* 1995, p. 190). In general, other stressors in the environment, such as habitat degradation and pollution, may weaken species' immune systems and make them more susceptible to disease and parasites (Whitfield *et al.* 2000, p. 657). Research specific to the dunes sagebrush lizard has not been conducted to determine if they have been infected with malaria or if they have parasitic helminthes. At this point, we have no information that disease or parasites are threats to the dunes sagebrush lizard.

Predation

During Hill and Fitzgerald's (2007) nesting ecology study, 25 percent of radio-tracked female dunes sagebrush lizards were eaten by coachwhips (*Masticophis flagellum*). Coachwhips are large, swift, diurnal snakes that feed primarily on lizard species. Another predator, the loggerhead shrike (*Lanius ludovicianus*), is found throughout the range of the dunes sagebrush lizard. Loggerhead shrikes are birds that occur in many habitats, from remote deserts to suburban areas. These small predators perch on trees, shrubs, poles, fences, and utility wires, and swoop down to capture and impale prey (Rappole 2000, p. 163). Increased perches and increased edge effects could lead to increased levels of predation that would affect the dunes sagebrush lizard. A study of flat-tailed horned lizards found that shrike counts are higher along edge habitats than in interior habitat patches (Barrow *et al.* 2006, p. 492). Areas with greater development are, therefore, more likely to have higher incidence of shrike predation than areas that are not fragmented.

Power line grids are located throughout oil and gas developments. The New Mexico State Land Office does not have a database of the power lines within the shinnery oak habitat and range of the dunes sagebrush lizard. However, many well pad operations and power plants are connected with a grid of transmission lines that are most dense in areas of high development. The ongoing threat associated with power lines and fences is that they provide perching habitat for predaceous birds throughout the shinnery oak dunes. The conservation measures in the New Mexico Conservation Agreements and Texas Conservation Plan will minimize habitat disturbance, including powerlines in dunes sagebrush lizard habitat. They provide that new powerlines and fences will not be allowed on enrolled lands in dunes sagebrush lizard habitat. This will limit and reduce habitat fragmentation and reduce perch sites for shrikes. Moreover, over 50 percent of the dunes sagebrush lizard's habitat remains unfragmented (Service 2012). We acknowledge that dunes sagebrush lizards may be taken by shrikes at an increased rate in developed areas, but conclude that the remaining unfragmented interior habitat will have decreased predation pressure, and thus predation does not pose a significant threat to the species as a whole now or in the future.

Feral hogs are now found in 17 counties in New Mexico, including all of the counties with dunes sagebrush lizards. Recently, feral hogs have been found in the shinnery oak dune habitat (Carswell 2011, p. 1). Feral hogs are voracious predators that have been found to eat great numbers of small vertebrates. However, we have no information on the effect of feral hogs on dunes sagebrush lizard populations. Through the New Mexico Conservation Agreements, CEHMM and BLM are working with the U.S. Department of Agriculture to find and eradicate feral hogs within dunes sagebrush lizard habitat in New Mexico before the threat is fully realized.

Summary of Factor C

There are likely impacts to individuals from predation. It is expected that predation rates would be highest in developed areas that provide more perch sites for shrikes. The new conservation measures restricting and limiting development to areas outside of shinnery oak dunes habitat will lessen the predation pressure in core habitats. We also believe that there is adequate unfragmented core habitat within the species range, and we would not expect increased predation pressure in these

areas. Therefore, we conclude that disease or predation do not pose significant threats to the dunes sagebrush lizard now or in the future.

D. The Inadequacy of Existing Regulatory Mechanisms

Under New Mexico's Wildlife Conservation Act, on January 24, 1995, NMDGF listed the dunes sagebrush lizard as a group 2 Endangered Species (Painter *et al.* 1999, p. 1). This listing affords the lizard protection from take, but not from habitat destruction (NMDGF 1978, p. 9). The dunes sagebrush lizard is not listed as endangered or threatened in the State of Texas under either the Texas Parks and Wildlife Code or the Texas Administrative Code (Texas Parks and Wildlife Department 1973, p. 1). We are not aware of any local laws or ordinances that protect the dunes sagebrush lizard and its habitat in New Mexico or Texas.

Current regulations under State and local laws are not designed, nor have provisions, to protect the dunes sagebrush lizard from habitat loss. However, there are conservation measures that are enforced by the BLM, under their RMP, that remove or alleviate threats on BLM land in dunes sagebrush lizard habitat. The RMPA established BLM's internal guidance for managing these species in southeastern New Mexico. Along with other measures, the RMPA allows BLM to place oil and gas development up to 200 m (650 ft) outside of dunes sagebrush lizard habitat, and prioritizes the reclamation of nonfunctioning oilfield development in areas that will most benefit the dunes sagebrush lizard. The RMPA also prohibits herbicide treatment in dunes sagebrush lizard habitat. In accordance with the RMPA, BLM identified 53,657 ha (132,590 ac) that are currently unleased dunes sagebrush lizard habitat that will be closed to future leasing. Since 2008, the RMPA has been used to guide development within the planning area, which includes all BLM land within the range of the dunes sagebrush lizard in New Mexico. The RMPA provides baseline conservation measures, and removes habitat from leasing to prevent the continued loss of dunes sagebrush lizard habitat on Federal lands in New Mexico. BLM has also removed over 172 ha (425 ac) of caliche pads and roads, along with associated oil and gas infrastructure. At the time of our proposed rule, we did not have a full understanding of how BLM implements the RMPA. BLM has now provided detailed information regarding the processes involved in implementing the RMPA. For instance, no exceptions have been made to the conservation measure that keeps development outside of dunes sagebrush lizard habitat, unlike our assumptions in the proposal. The RMPA provides the foundational requirements for any activities located within the delineated habitat for the dunes sagebrush lizard on BLM lands, and all staff are aware of these requirements.

In the proposal, the Service understood statements within the RMPA such as ''may move development out of dunes sagebrush lizard habitat up to 200 meters'' to mean that this was optional and potentially unenforceable. We have since received detailed comments from BLM regarding the implementation of the RMPA that have changed our understanding of the RMPA. Based on BLM's comments, the Service now understands that the statement ''may move development up to 200 meters outside of dunes sagebrush lizard habitat'' authorizes BLM to move development outside of dunes without further analysis. If BLM has to move development greater than 200 meters, further analysis and documentation must first occur. The BLM has not issued exceptions to this conservation measure, and exceptions to the conservation measures are very difficult to obtain.

BLM staff from all divisions meet weekly to discuss new applications to drill, or other activities that may affect special status species including the dunes sagebrush lizard. When a well location is proposed near dunes sagebrush lizard habitat, resource specialists accompany the permitting agent to the proposed location to ensure that the well is placed outside of shinnery oak dune habitat.

BLM does not treat the RMPA as discretionary guidance, but instead implements it with all activities in dunes sagebrush lizard and lesser prairie-chicken habitat. The regulations pertaining to resource management practices are at 40 CFR 1500, which discusses the overview of Federal land management, while regulations at 40 CFR 1600 discuss the specifics about implementation of the National Environmental Policy Act and Federal Land Policy and Management Act. The RMPA provides a standard to consistently guide the protection of the dunes sagebrush lizard, and reduce or eliminate the threats to the species and its habitat on BLM lands in New Mexico. Fifty-four percent of the dunes sagebrush lizard's entire range is covered by BLM's RMPA, and 24 percent (53,657 ha (132,590 ac)) of the habitat in New Mexico is currently unleased and has been removed from future leasing by the RMPA.

In summary, we conclude that inadequacy of existing regulatory mechanisms does not pose a threat to the dunes sagebrush lizard.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Exposure to Pollutants

Though few studies have been conducted to determine the full effects of pollutants on reptiles, there is conclusive evidence of some adverse impacts to lizard species (Whitfield *et al.* 2000, p. 657). Sias and Snell (1998) studied the effects of oil and gas wells on dunes sagebrush lizard abundance from 1995 to 1997. The results of their research showed a strong negative relationship between dunes sagebrush lizard population density and proximity to well pads. Specifically, they found a 39 percent decrease in the abundance of dunes sagebrush lizards within 0 to 80 m (0 to 260 ft) of wells. Sias and Snell (1996, p. 30) believe that oil and gas extraction resulted in a reduction in abundance of dunes sagebrush lizards as a result of: (1) Direct habitat loss due to construction of roads and well pads (as discussed above in Factor A); (2) poisoning of dunes sagebrush lizards from oil spills, hydrogen sulfide gas emissions, and exposure to chemicals and other toxins in the vicinity of oil and gas wells; (3) mortality caused by increased traffic; and (4) giving a competitor of the dunes sagebrush lizard a competitive advantage (see ''Competition'' section below).

During petroleum extraction, hydrogen sulfide is removed from the petroleum and released into the air, where it remains for up to one day. Hydrogen sulfide is heavier than air and tends to sink to the ground, where it remains until it is neutralized (Kraft 2010, p. 1). Hydrogen sulfide is a highly toxic gas that is the dominant reduced (unoxygenated) sulfur gas in oilfields (Tarver and Dasgupta 1997, p. 3669). Measurements of hydrogen sulfide have been taken at a site near Loco Hills, New Mexico (40 km (25 mi) east of Artesia), near historical dunes sagebrush lizard sites. Air concentrations of hydrogen sulfide as high as 33 parts per million (ppm) were recorded for a period of 32 minutes in the Loco Hills area of New Mexico (Lusk and Kraft 2010, p. 19). Lusk and Kraft (2010) recommend the adoption of interim air quality standards for the protection of wildlife at 1 ppm, the requirement of routine monitoring of hydrogen sulfide to identify sources in areas where ambient concentrations exceed 1 ppm, and the reduction of

emissions to meet these wildlife conservation goals.

Most of the sulfur that is emitted by oil and gas infrastructure ends up in the soil (Tarver and Dasgupta 1997, p. 3674). Surface soil tests in active oilfields in Texas found sulfate (an oxygenated form of sulfur) levels in the soil to range between 20 to 200 ppm near active facilities, as opposed to 1 ppm in similar soils not adjacent to oil facilities (Tarver and Dasgupta 1997, p. 3674). Dunes sagebrush lizards dig just below the soil surface during hot parts of the day and at night and would, therefore, be in direct contact with the sulfates in the soil. Sulfates increase the anaerobic activities in the soil, make the soil more acidic, and could cause protein and gene damage to organisms, depending on the duration of exposure (Escher and Hermens 2002, p. 4203). Acidic soil is directly linked to small hatchling size and slower running speed, which can influence survival and success rates of juvenile lizards (Marco *et al.* 2005, p. 109).

The long-term impacts of oilfield pollutants to dunes sagebrush lizard populations, fecundity, and survivorship are unknown. Oilfields contain a variety of organic toxic pollutants including petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), phenanthrene, fluoranthene, and benzo[a]anthracene. Two studies on the impacts of oil and gas pollution to another sand-dwelling lizard, the Nidua fringe-fingered lizard (*Acanthodactylus scutellatus*), a sand-dwelling species from the Middle East, were conducted in the oilfields in Kuwait. Tissue samples taken from both the fringe-fingered lizard and its insect prey base (ants) found the PAH concentrations in the fringe-fingered lizard and ant tissue increased with the exposure to the toxins. The levels of PAHs in the fringe-fingered lizard and ant tissues were high enough to affect the function of vital organs. Fringe-fingered lizards are not able to remove the toxins from their system quickly, due to their slow metabolic rate and simple enzyme system (Al-Hashem *et al.* 2007, p. 555). Additionally, the exposure to oilfield chemicals affected the behavior and foraging time for the fringe-fingered lizard by altering time of emergence and basking behavior (Al-Hashem *et al.* 2008, p. 589).

If dunes sagebrush lizards are exposed to this type of pollution, we may expect physiological dysfunction, impaired foraging abilities, increased mortality, and population declines. For this reason, we believe the exposure to pollutants from oil and gas production may be a factor affecting the survival of individuals and populations located around oil and gas development. It is also likely that exposure to pollutants in areas of development cannot be separated from the cumulative effects of development as a whole. It is anticipated that the conservation measures, restricting and limiting development to areas outside of shinnery oak dunes habitat, are expected to limit the dunes sagebrush lizard's exposure to pollutants.

Companies enrolled in the New Mexico Conservation Agreements and Texas Conservation Plan have agreed to routine maintenance schedules to reduce the risk of spills. In New Mexico, companies enrolled in the New Mexico Conservation Agreements have agreed to an adaptive management approach to reducing the risk of hydrogen sulfide exposure. The conservation measure will determine areas of high hydrogen sulfide risk, and will also determine the distance at which hydrogen sulfide is a threat to the dunes sagebrush lizard. Then measures, such as alarms or shut-off valves, will be put in place in the high-risk areas to reduce the risk of exposure. Since over half of the dunes sagebrush lizard's range is not fragmented, we conclude that there is adequate core habitat available within the species' range to provide areas without increased exposure to pollutants.

Competition

The side-blotched lizard and the prairie lizard (*Sceloporus consobrinus*) are generalist lizard species found throughout the range of the dunes sagebrush lizard. Researchers studying the dunes sagebrush lizard have reported that the side-blotched lizard is a competitor for resources with the dunes sagebrush lizard (Sena 1985, p. 13) and has been observed directly competing for insect prey (Sias and Snell 1996, p. 6). In areas where there are large dune blowouts in shinnery oak dune complexes, the dominant lizard species is the dunes sagebrush lizard. As the habitat becomes marginal with smaller dune blowouts adjacent to shinnery oak flats or unsuitable habitat, there are greater numbers of side-blotched lizards and fewer dunes sagebrush lizards. In areas that have more habitat disturbance and greater edge effects, there are also more side-blotched lizards than dunes sagebrush lizards (Painter 2007, p. 2). The side-blotched lizard is the most abundant lizard found in the same habitat as the dunes sagebrush lizard. The side-blotched lizard uses more open, sandy substrate than the dunes sagebrush lizard, which uses the vegetative cover provided by shinnery oak. The side-blotched lizard also spends more time in the open sun and more time foraging (Sartotrius *et al.* 2002, pp. 1972–1975). As a generalist, the side-blotched lizard is not affected by habitat disturbance and alteration in the way that dunes sagebrush lizard, a habitat specialist, is affected (Sias and Snell 1996, p. 18; Painter *et al.* 2007, p. 3). The side-blotched lizard may either out-compete the dunes sagebrush lizard in these altered habitats, or is simply filling a niche when the sites no longer support dunes sagebrush lizards. The prairie lizard is often found in adjacent shinnery oak and mesquite flats, and may thrive in areas where shinnery oak dunes no longer occur.

Summary of Factor E

The Service concludes that there is sufficient certainty that the commitment to place development outside of the dunes sagebrush lizard's shinnery oak dune habitat will be implemented and will be effective. Therefore, the risk of competition, and exposure to pollutants, will only be localized stressors, and will not pose significant threats to the species as a whole. Leaving large areas of unfragmented habitat intact will decrease the risk of exposure to both pollutants and competitors.

Cumulative Impacts

Some of the potential threats discussed in this finding could work in concert with one another to cumulatively affect the dunes sagebrush lizard to the point that they may, in combination, become significant threats to the species, either now or in the future. However, we conclude that the suite of conservation efforts in the RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan address and alleviate all of the threats to the dunes sagebrush lizard adequately for the species to continue to be viable into the future.

Determination

As required by the Act, we considered the five factors in assessing whether the dunes sagebrush lizard meets the definition of a threatened or endangered species. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the dunes sagebrush lizard. Based on our review of the best available scientific and commercial information, we find that the current and future threats are not of sufficient imminence, intensity, or magnitude to indicate that the dunes sagebrush lizard is in danger of extinction (endangered), or likely to become endangered within

the foreseeable future (threatened), throughout all or a significant portion of its range. Therefore, the dunes sagebrush lizard does not meet the definition of a threatened or endangered species and we are withdrawing the proposed rule to list the dunes sagebrush lizard as endangered. Our rationale for this finding is outlined below.

The dunes sagebrush lizard is not in danger of extinction now because it currently occurs in an area of sufficient size and distribution that it is expected to be resilient to random natural impacts. Further, its distribution encompasses the known genetic diversity of the species such that current populations are representative of the known diversity of the species. As such, the species has not currently declined to the point that it is subject to impacts from stochastic events that would result in a change in the status of the species as a whole. In other words, if the species continues to occur in its current distribution, we expect it will have sufficient resiliency, redundancy, and representation to be viable now and in the foreseeable future.

In our proposed rule, we identified several threats that significantly impacted the status of the species. This was an appropriate conclusion based on the best scientific and commercial information available at that time. However, since that time, significant ongoing and future conservation efforts, in combination with new information on the status and distribution of the species, have reduced the magnitude of potential impacts now and in the future such that the species no longer meets the definition of an endangered or threatened species.

In our proposed rule, we identified loss of habitat due to oil and gas development and the treatment of shinnery oak dune habitat with tebuthiuron as the most significant threats to the continued existence of the dunes sagebrush lizard. Our conclusion was based on information about past and current impacts to lizard habitat due to these stressors, information about potential future development within lizard habitat, and the lack of areas protected from these impacts.

Since the time of our proposed listing, there have been many efforts to develop conservation measures for the dunes sagebrush lizard in Texas, and substantial interest in the existing conservation plans in New Mexico. Several conservation plans, including the New Mexico Conservation Agreements, Texas Conservation Plan, and BLM's RMPA, put in place conservation efforts that have been implemented by the States, BLM, private landowners, and oil and gas companies, and have a high level of certainty of continuing to be implemented in the future and of being effective. These efforts have reduced or eliminated threats to the dunes sagebrush lizard. When considered together, the area that has been has been removed from oil and gas leasing, is enrolled in the New Mexico Conservation Agreements, or is covered by BLM's RMPA amounts to 95 percent (211,703 ha (523,129 ac)) of the dunes sagebrush lizard's habitat in New Mexico. Further, 71 percent (56,105 ha (138,640 ac)) of the mapped dunes sagebrush lizard habitat in Texas has been enrolled in the Texas Conservation Plan.

In New Mexico, conservation measures within the New Mexico Conservation Agreements limit development to areas outside of the dunes sagebrush lizard's shinnery oak dune habitat. In addition, the New Mexico Conservation Agreements and BLM's Restore New Mexico Program have conservation measures or mitigation measures that remove caliche roads and pads, along with other nonfunctioning oil and gas infrastructure. This measure creates additional habitat and reduces fragmentation throughout the dunes sagebrush lizard range, enhancing dunes sagebrush lizard habitat conservation through avoidance.

The Texas Conservation Plan also focuses on the avoidance of activities within lizard habitat that would further degrade habitat, reclamation of lizard habitat to reduce fragmentation, and, due to the presence of mesquite, removal of mesquite that is encroaching into shinnery oak dunes. If avoidance of lizard habitat cannot be accomplished, the participants may adopt conservation measures that minimize habitat impacts, and as a last resort, mitigate for the loss of lizard habitat. The Texas Conservation Plan limits habitat loss to 1 percent of delineated dunes sagebrush lizard habitat within the first 3 years, with a total of 10 percent of the entire delineated habitat allowed to be taken over the 30-year life of the plan. Even though the Texas Conservation Plan allows for the loss of some dunes sagebrush lizard habitat, no ground-disturbing activity can take place in delineated dunes sagebrush lizard habitat until reclamation work has successfully created dunes sagebrush lizard habitat elsewhere within the range of the species.

The second most significant threat described in the proposed rule was the rangewide application of tebuthiuron to reduce or kill shinnery oak in dunes sagebrush lizard habitat. In 2011, the NRCS finalized Technical Note 53, which states that no tebuthiuron treatments may occur in shinnery oak dunes within the range of the dunes sagebrush lizard in New Mexico. Also, the RMPA, New Mexico Conservation Agreements, and Texas Conservation Plan all prohibit the application of tebuthiuron on shinnery oak dunes.

Conservation measures that limit development and activity within habitat are also in place to minimize impacts of other less significant potential threats such as OHV, wind and solar development, predation by nonnative species, and increased predation due to development.

We have a high degree of certainty that New Mexico Conservation Agreements will continue to be implemented and that the Texas Conservation Plan will be implemented. As summarized in the *Ongoing and Future Conservation Efforts* section, above, we have determined that the New Mexico Conservation Agreements have a high certainty of being implemented. Our reasons for concluding that our level of certainty is high are that the level of enrollment is high (over 83 percent of lizard habitat is enrolled), the mechanism and authorities for collecting funds are in place, the process for allocating funds to support reclamation work and research in lizard habitat is in place, the monitoring and documentation of compliance with the conservation measures are in place, and monthly and annual reports are complete, and all parties have the legal authorities to carry out their responsibilities under the New Mexico Conservation Agreements.

Further, we have determined that the Texas Conservation Plan has high certainty of implementation. The Service issued the permit to the permittee on February 17, 2012. Since then, in a short time, the permittee has enrolled significant acreages, collected funds from current enrollees, and has created and set into motion a non-profit organization to administer specific functions of the Texas Conservation Plan, including but not limited to, outreach to attract more participation. As of May 2012, 71 percent (56,105 ha (138,640 ac)) of dunes sagebrush lizard habitat in Texas is enrolled in the Texas Conservation Plan. Enrollees have collectively remitted approximately $773,000 in participation fees into the Habitat Protection Fund administered by the Texas Conservation Plan. These funds cannot be used by the Texas Legislature for any other purpose. Additionally, some of the same

companies who are enrolled in the New Mexico Conservation Agreements have also either enrolled or committed to enroll acres in Texas. Two major operators, Conoco-Phillips and Bopco, are enrolled in both plans. As evidenced by the enrollment acreages and funds collected thus far, numerous other companies have submitted enrollment forms to enroll in the Texas Conservation Plan. However, due to confidentiality protections provided by the Texas Conservation Plan, those company names have not been disclosed to date. The high level of participation and compliance with the New Mexico Conservation Agreements and additional voluntary conservation efforts prescribed by the Texas Conservation Plan supports our determination that similar enrollment, implementation, and success is likely to be achieved in Texas.

We also have high certainty that the New Mexico Conservation Agreements and Texas Conservation Plan will be effective at reducing and eliminating threats to the dunes sagebrush lizard to the point that the species no longer meets the definition of threatened or endangered. Our certainty arises from the fact that the primary effect of both plans is to move further impacts outside of occupied dune complexes. Further, the agreements have sufficient monthly and annual monitoring and reporting requirements to ensure that all of the conservation measures are implemented as planned, and are effective at removing threats to the lizard and its habitat. The collaboration between the Service and other stakeholders requires regular meetings and involvement of all parties in order to implement the agreements fully.

In summary, we conclude that the conservation efforts have sufficient certainty of implementation and effectiveness that they can be relied upon in this final listing determination. Further, we conclude that the conservation efforts have reduced or eliminated current and future threats to the dunes sagebrush lizard to the point that the species no longer is in danger of extinction now or in the foreseeable future. Therefore, we conclude that listing the dunes sagebrush lizard as an endangered or threatened species is not warranted, and are withdrawing our proposed rule to list the dunes sagebrush lizard as endangered.

We will continue to monitor the status of the species through monitoring requirements in the New Mexico Conservation Agreements and Texas Conservation Plan, and our evaluation of any other information we receive. These monitoring requirements will not only inform us of the amount of dunes sagebrush lizard habitat conserved and reclaimed, but will also help inform us of the status of the dunes sagebrush lizard. Additional information will continue to be accepted on all aspects of the species. We encourage interested parties, outside of those parties already signatories to the New Mexico Conservation Agreements and Texas Conservation Plan, to become involved in the conservation of the species.

If at any time data indicate that the protective status under the Act should be reinstated, including, but not limited to, information that enrollment in the voluntary agreements has declined substantially, or if we become aware of noncompliance issues with the conservation measures, or if there are new or increasing threats, we can initiate listing procedures, including, if appropriate, emergency listing pursuant to section 4(b)(7) of the Act.

References Cited

A complete list of all references cited in this document is available on the Internet at *http://www.regulations.gov* at Docket No. FWS–R2–ES–2010–0041 or upon request from the Field Supervisor, New Mexico Ecological Services Field Office (see **ADDRESSES** section).

Authors

The primary authors of this document are the staff members of the New Mexico Ecological Services Field Office (see **ADDRESSES**).

Authority: The authority for this action is the Endangered Species Act of 1979, as amended (16 U.S.C. 1531 *et seq.*).

Dated: June 12, 2012.

Daniel M. Ashe,

Director, U.S. Fish and Wildlife Service.

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