

**FINAL INVESTIGATION REPORT**

**Status of the Lesser Prairie-Chicken in New Mexico:**

**Recommendation to Not List the Species as Threatened  
Under the New Mexico Wildlife Conservation Act**

**Submitted:  
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## CHAPTER 1. INTRODUCTION

### 1.1 Background

The lesser prairie-chicken (*Tympanuchus pallidicinctus*; LPCH) historically occupied sandhill habitat characterized by shinnery oak (*Quercus havardii*)-bluestem (*Andropogon* spp.) and sand sage (*Artemisia filifolia*)-bluestem communities in the plains of eastern New Mexico (Bailey 1928, Ligon 1961, Hubbard 1978) and portions of southeastern Colorado (Hoffman 1963, Giesen 1994a), southwestern Kansas (Schwilling 1955, Horak 1985, Thompson and Ely 1989, Jensen et al. 2000), western Oklahoma (Duck and Fletcher 1944, Copelin 1963, Horton 2000), and the Texas panhandle (Henika 1940, Oberholser 1974, Sullivan et al. 2000) (Figure 1.1). They are directly and indirectly dependent on vegetative components available in those native rangelands. Since the 19<sup>th</sup> century, LPCH and the habitats upon which they depend have declined >90% (Crawford and Bolen 1976, Taylor and Guthery 1980a). Habitat losses through conversion of native prairie to expanding agriculture (Crawford and Bolen 1976), poor grazing management practices (Jackson and DeArment 1963, Riley et al. 1992), herbicide use for shrub control (Jackson and DeArment 1963, Cannon and Knopf 1981), habitat fragmentation from oil and gas development (Hunt 2004), and prolonged drought throughout their range (Giesen 1998) are contributing factors leading to the decline in LPCH numbers and further isolated distribution.

Concern has been expressed that LPCH populations, habitat quality, and habitat quantity have been declining throughout the range of LPCH, including New Mexico. In response to declining LPCH abundance and distribution, a petition was submitted to the U.S. Fish and Wildlife Service (USFWS) in 1995 to list the LPCH as threatened. The Service's finding on the petition was "warranted but precluded," indicating the USFWS felt the species warranted protection but was precluded from listing by higher priority species. (Federal Register 63:110, 31400-31406). The status of the bird is reviewed annually in a candidate notice of review (CNOR), and remains a Candidate Species for federal listing today.

In 1997, New Mexico Department of Game and Fish (NMDGF) was also petitioned to investigate the status of the LPCH for listing as threatened under New Mexico's Wildlife Conservation Act (WCA). In 1999, the petition was accepted, however, the Director withdrew a recommendation to list LPCH as threatened until more information on the status of the population could be obtained. Following this finding, a species status review and investigation were initiated to develop information relating to population, distribution, habitat needs, limiting factors, and other biological and ecological data to determine a recommendation for listing or not listing the species. Based on all currently available information, the LPCH is unlikely to be threatened with extirpation or become endangered within the foreseeable future in a significant portion of its core range in New Mexico. Thus, it is the finding of this investigation that the current status of LPCH in New Mexico does not warrant a listing under the WCA.

### 1.2 Species Taxonomy

The LPCH is a member of the family Phasianidae (grouse and ptarmigan) and is one of eleven species of grouse found in North America. Although generally comparable in morphology, plumage, and behavior to the greater prairie-chicken (*T. cupido*), the LPCH is recognized as a species separate from the greater prairie-chicken (AOU 1957, Giesen 1998)

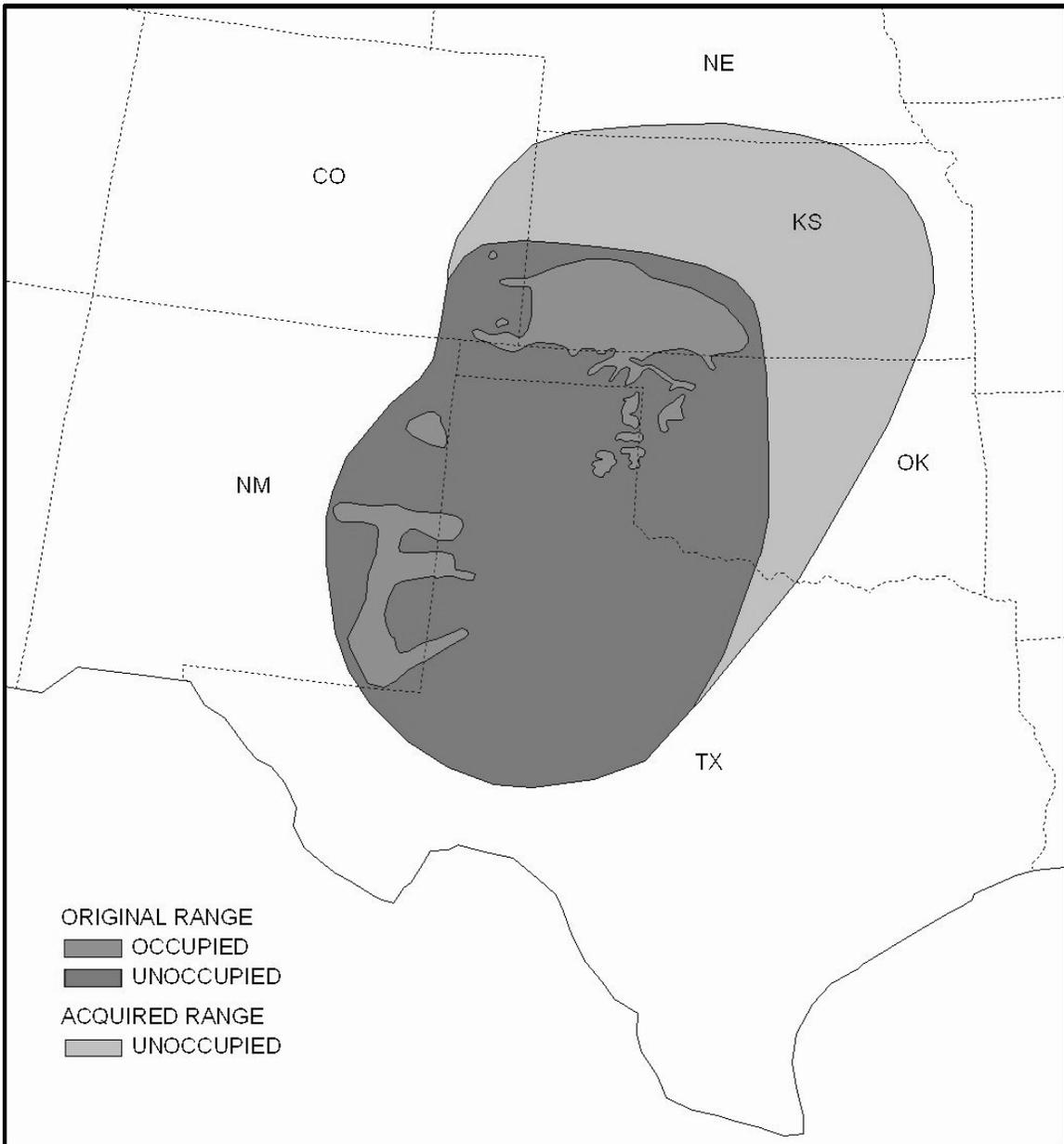


Figure 1.1. Historical and occupied range of the lesser prairie-chicken (from Schroeder et al. 2004).

### 1.3 Seasonal Activities and Habitats

During the breeding season (mid-February through early May, but primarily during April), male LPCH congregate on traditional lek sites and perform courtship displays to attract hens for mating. Nests are initiated mid-April through late May, typically within 2 weeks of lek attendance and copulation (Bent 1932, Copelin 1963, Snyder 1967, Merchant 1982, Haukos 1988). Hatching peaks late May through mid-June throughout the range (Copelin 1963, Merchant 1982). Re-nests (if initial clutch is lost) are initiated mid-May through early June, with hatching mid-June through early July (Merchant 1982). In the autumn and winter, birds assemble into mixed flocks feeding primarily in shinnery oak-grasslands, but may also feed on waste grains.

Habitat components necessary to fulfill LPCH life history needs include nesting habitat, brood-rearing and summer habitat, and autumn/winter habitat. The combined home range of all birds at a lek is approximately 19 square miles (>12,000 acres). However, the average home range of an individual bird is about four square miles (Bidwell et al. 2003). Although the minimum habitat patch size to support LPCH is not clear, several studies have speculated that approximately 2,530 – 25,000 acres of contiguous native rangelands may be necessary to sustain viable LPCH populations (Davison 1940, Crawford and Bolen 1976, Taylor and Guthery 1980b, Woodward et al. 2001, Bidwell et al. 2003).

#### Lek Sites

LPCH have high fidelity to lek sites (Campbell 1972) and males use traditional leks sites year after year. Lek sites are characterized by sparse, low vegetation and are often located on a knoll or ridge, or grama-grass flat (Jones 1963, Copelin 1963, Cannon and Knopf 1979, Taylor and Guthery 1980a, Giesen 1991). Disturbed areas such as roads, abandoned oil and gas drill pads, and herbicide treatments (Crawford and Bolen 1976, Davis et al. 1979, Sell 1979, Taylor 1979, Ahlborn 1980, Locke 1992), or prairie dog towns (Bidwell et al. 2003) may be used as lek sites. Applegate and Riley (1998) recommended clusters of 6-10 or more leks, each with a minimum of six males, separated from one another by a distance of 1.2 miles or less. A number of studies have reported inter-lek distances of a mile or less (Jamison et al. 2002a). At this density, a complex of 6-10 lek sites could fall within a habitat patch size of roughly four square miles. If each lek in the cluster was surrounded by a two-mile radius area (i.e., the minimum breeding season patch size around a lek), the entire lek and core habitat complex might occupy up to 32 square miles (~21,000 acres), with a wider perimeter of habitat for autumn and winter foraging and escape cover. This is more or less consistent with the 25,000-acre estimate of Bidwell et al. (2003). In New Mexico, availability of lek sites is not regulating LPCH populations; however, certain types of human-caused disturbance may interfere with courtship and mating activities, and may cause the abandonment of lek sites (see Section 4.6).

### **Nesting Cover**

Hens typically select nest sites within 1.8 miles of leks (Suminski 1977, Riley 1978, Giesen 1994b). The importance of herbaceous cover for nesting as a key component influencing nest fate of LPCH is well documented. Nests are usually within sand sage-grassland or shinnery oak-grassland habitat, where clumps of tall residual vegetation are common (Davis et al. 1979, 1981; Giesen 1994b). In sand sage-grasslands, nests are most often in sand sage or in tall bunchgrasses (Giesen 1994b). In shinnery oak-grasslands, successful nests are typically associated with tall perennial grasses (e.g., bluestem), although shrubs are always present (Davis et al. 1979, 1981; Riley et al. 1992). The height and density of shrubs, forbs, or residual grasses are greater at the nest site than in the surrounding rangeland, and are greater at successful nests than at unsuccessful nests (Riley 1978, Davis et al. 1979, Wisdom 1980, Haukos and Smith 1989, Riley et al. 1992). Where residual herbaceous cover is less abundant, LPCH become more dependent on shrubs for nesting (Sell 1979, Johnson et al. 2004).

### **Brood Habitat**

Habitats used for brood-rearing are usually within 1.8 miles of lek sites and typically contain more bare ground (roughly 60%) than nest areas, with more forbs, less grass cover, and lower grass height. (Applegate and Riley 1998). Broods use habitat with taller plant cover, compared to habitat used by adults without broods (Davis et al. 1979). Brood-rearing locations are usually associated with higher levels of insect abundance (Jamison et al. 2002b) and allow young chicks to move easily on the ground (Bidwell et al. 2003). Active sand dunes with shrubs, especially shinnery oak or sand sage, are common in brood-rearing habitat. Shrubs appear to be used for shade in summer. Brood-rearing habitats are often found in areas with higher intensity grazing regimes or areas more recently burned, than nesting areas. Moderate grazing or other disturbance provides a mosaic of vegetation with more abundant forbs and more bare ground than in nesting habitat (Davis et al. 1979).

### **Autumn/Winter Habitat**

LPCH typically range across larger areas during the autumn and winter months, occupying the same general habitats as are used for nesting and brood-rearing. (Giesen 1998). LPCH use sand sage-grassland or shinnery oak-grassland for resting and roosting (Taylor and Guthery 1980a). The birds also feed in this habitat, or in nearby agricultural fields with waste grains if they are located adjacent to rangelands that provide adequate cover for resting and concealment. Shinnery oak provides leaves, catkins, acorns, and insect galls as food resources. Planted food plots may provide additional food. However, food plots <10 acres or far from rangeland escape cover may attract predators and enhance predation (Bidwell et al. 2003).

## 1.4 Diet

The LPCH diet consists of insects, seeds, leaves, buds, and cultivated grain crops (Copelin 1963, Jones 1963; 1964, Donaldson 1969, Crawford 1974, Crawford and Bolen 1976, Davis et al. 1979, Olawsky 1987, Riley et al. 1993). Invertebrates are important to LPCH throughout their life cycle, but particularly in the diet of juveniles <10 weeks old (Davis et al. 1979, Jones 1964). Grain fields are also used for winter foraging in areas where cultivated lands occur in the vicinity of rangelands. The importance of grain crops in helping maintain LPCH populations when food resources may be limiting is not known. Bidwell et al. (2003) noted that food is generally not a limiting factor for upland game birds such as the LPCH; however, food plots may sometimes benefit small populations in fragmented habitats.

The LPCH obtains necessary moisture through food (Snyder 1967) and is not limited to rangelands having free surface water; however, LPCH will use surface water, typically from stock ponds, when available (Crawford and Bolen 1973).

## CHAPTER 2. LESSER PRAIRIE-CHICKEN DISTRIBUTION AND STATUS IN NEW MEXICO

### 2.1 Historic Distribution and Abundance

In the 1920s and 1930s, the former range of the LPCH in New Mexico was described as all of the sandhill rangeland of eastern New Mexico from the Colorado line south to the Texas line and west to the Pecos River Valley (Ligon 1961). Ligon (1927) mapped the historical range at that time as encompassing portions of 12 counties (Figure 2.1).

The LPCH has been extirpated from nearly 56% of its historical range in New Mexico and persists in sparse and scattered populations in 23% of its former distribution (Bailey and Williams 2000). The core of LPCH distribution occurs in east-central New Mexico where LPCH occupy portions of 6 counties, comprising 21% of their former range (Bailey and Williams 2000). Estimates of occupied range in New Mexico over the last century suggest a pattern of decline and increase, including reoccupation of former range (Snyder 1967).

Precise estimates of the historic abundance of LPCH in New Mexico are lacking. Sands (1968) estimated a peak population of 40,000 to 50,000 birds between 1949 and 1961 and by 1968 judged the population had fallen to between 8,000 to 10,000 individuals. In 1979, Crawford (1980) speculated the population was again 10,000 birds. Although no population estimates are available, lek survey data from 1971 through 1997 analyzed by the New Mexico Natural Heritage Program show a clear and substantial population decline after 1988 on lands administered by the Bureau of Land Management (BLM), particularly in the southern periphery of their range (Johnson and Smith 1999). Johnsgard (2002) estimated the 2000 spring breeding population in New Mexico was <1,000 birds.

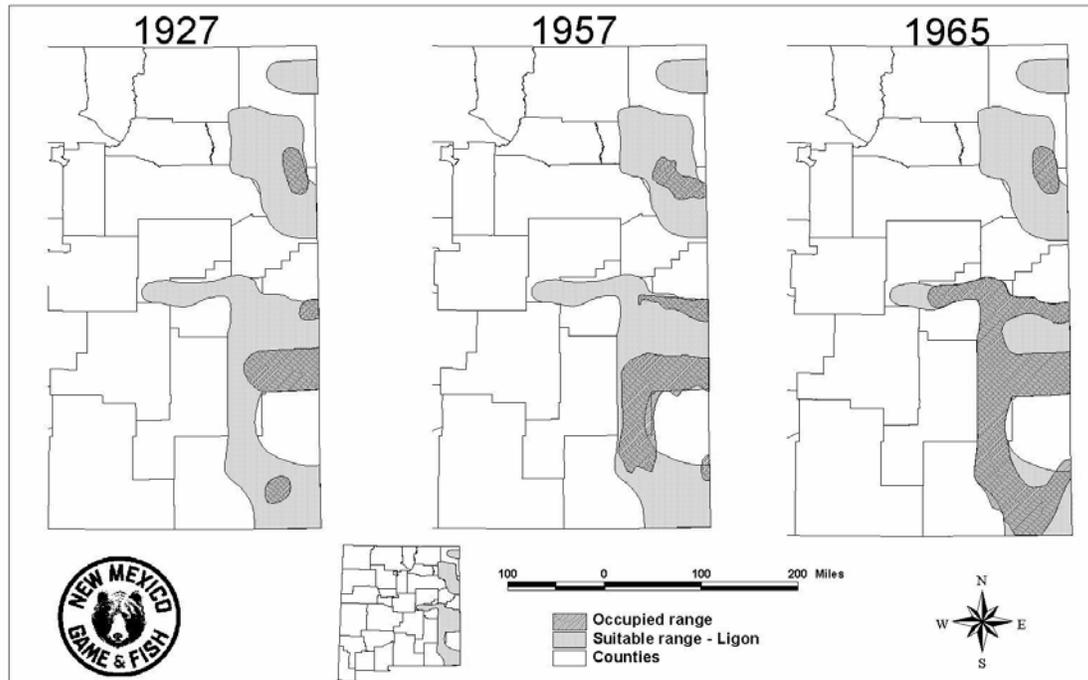


Figure 2.1. Distribution of lesser prairie-chicken in their historical and occupied range of eastern New Mexico as mapped by Ligon (1927), Frary (1957), and Snyder (1967).

To obtain better data on LPCH population status and trends, the Department has conducted roadside route surveys over the past eight years to identify active leks on public and private lands in core and sparse and scattered portions of the occupied LPCH range in eastern New Mexico (Appendix I). The total number of leks detected has been stable over this time period with no notable increases or decreases (Davis 2005). In addition to NMDGF surveys. The BLM visits known and historic lek sites to determine activity and birds present. Annual surveys conducted by the BLM Roswell Field Office indicate the number of active leks detected on the Caprock Wildlife Habitat Area more than doubled from 1999 through 2005 and the number of birds observed per lek was up from 6.00 in 1999 to 8.73 in 2005 (E. Jaquez, BLM, personal communications) (Table 2.1). However, variation in survey effort among years and in the number of leks visited and observed has occurred. Consequently, the number of active leks detected each year may be a biased measure of trend due to variation in survey effort.

The Department also conducts surveys on State Game Commission-owned Prairie Chicken Areas (PCAs) (Appendix I). These surveys have documented an increase in LPCH leks and in numbers of birds observed on or near PCAs since 1996 (Figure 2.2), possibly indicating a reversal of the downward trends of the early 1990s, at least in areas where the species receives management protection (Davis 2005).

Table 2.1 LPCH on the Caprock Wildlife Habitat Area, Roswell Field Office (BLM), southeastern New Mexico, 1999-2005.

Year	Number of active leks	Mean number of birds/lek	Extrapolated population estimate
1999	16	6.00	168
2000	25	9.24	425
2001	27	7.89	537
2002	34	10.74	773
2003	37	11.84	900
2004	48	8.65	794
2005	64	8.73	788

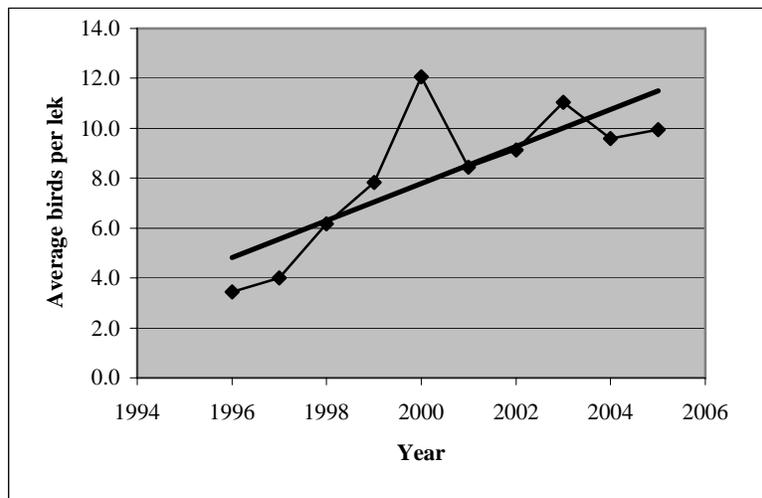


Figure 2.2. Changes in lek size (birds per lek) for LPCH observed on or near PCAs in eastern New Mexico, 1996-2005.

## 2.2 Harvest Estimates

In New Mexico, the LPCH is a game species managed by the Department. Limited hunting of the species was allowed in 1948 and continued periodically through 1966. Within this 19-year period, approximately 15,000 birds were harvested with no noticeable effect on the population (Sands 1968). During 1958-1995, responses from post-season harvest survey questionnaires indicated the estimated harvest of LPCH peaked at about 4,000 birds in 1988. The estimated harvest declined abruptly in 1989 and 1990 and continued to decline to the lowest level of an estimated 50 birds in 1995 (Figure 2.3). The hunting season was closed in 1996.

Reproductive success of LPCH is typically measured by age ratios (chicks per hen) obtained from wings inspected at hunter check stations. Samples taken in New Mexico

during the 1958-1968 hunting seasons averaged 3.7 chicks per hen, ranging from 1.4 to 10.2 (Campbell 1972). A 1988 check station yielded a ratio of 4.11 chicks per hen, but the ratios from 1989 and 1995 check stations were only 0.65 and 0.59, respectively (NMDGF 1995, unpublished report). The low recruitment observed for these years may have been indicative of a decline in LPCH numbers in east-central New Mexico.

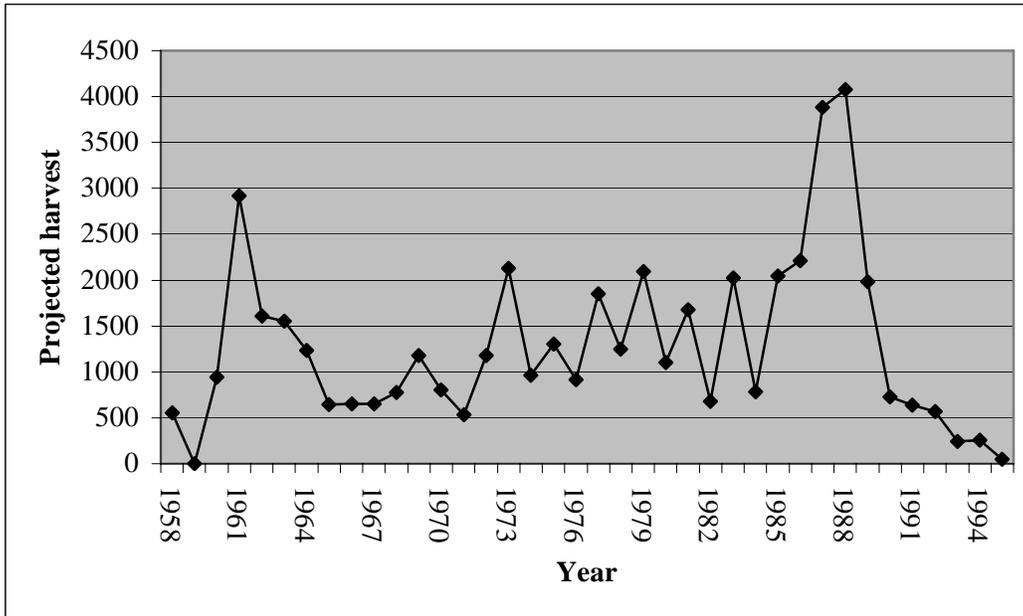


Figure 2.3. Estimated harvest of LPCH in New Mexico based on post-season harvest survey questionnaires, 1958-1995.

### 2.3 Current Status and Distribution

Ligon (1927) stated that LPCH range formerly included all of the sandhill type country in eastern New Mexico. Bailey and Williams (2000) described a division of the historical LPCH range in New Mexico into three categories, based on population status. Within east-central and southeast New Mexico, isolated population areas occur in east Eddy and south Lea counties, north from the Texas border to 33 degrees latitude. These are described as areas where LPCH populations are extirpated, or nearly so. At present a single known lek exists in southern Lea County, though LPCHs have been sighted in other areas and the existence of additional leks is suspected. Scattered populations occur in two areas: southeast Chaves County south of Highway 380, and areas north of 34 degrees latitude, primarily in north Roosevelt and Curry counties but also including small portions of east De Baca and south Quay counties. Well-distributed or core populations exist in roughly 16 percent of the historical range, north of Highway 380 and south of 34 degrees latitude in north Lea, south Roosevelt and northeast Chaves counties.

### **Northeast New Mexico**

Northeastern New Mexico contains the smallest amount of suitable LPCH habitat (Ligon 1927, Frary 1957, Snyder 1967). The Department has received few verifiable reports of LPCH in the northeastern part of the historical range since 1993. Department surveys provide additional evidence that LPCH no longer occupy their historical range within Union, Harding, and Quay counties in northeastern New Mexico.

### **East-central New Mexico**

Department surveys provide additional evidence that LPCH no longer occupy their historical range within east-central New Mexico in west and central DeBaca and Guadalupe counties west of Fort Sumner. Declines in sparse and scattered populations in north Roosevelt, Curry and east DeBaca counties may be indicative of changes in land use (e.g., wind power development, juniper (*Juniperus* sp.) encroachment), which might have impacted LPCH populations.

The core of remaining LPCH populations in New Mexico lies in south Roosevelt, north Lea, and northeast Chaves counties (Figure 2.4) and contains the largest contiguous amount of available habitat. In 2005, the Department estimated a minimum breeding population of about 3,800 birds for the area surveyed in east-central New Mexico (Appendix I). Annual rates of change in population trend suggest overall LPCH numbers are stable or slightly increasing in east-central New Mexico.

### **Southeast New Mexico**

The southeast area represents the southern periphery of LPCH range and may only be occupied during favorable climatic periods (Snyder 1967). LPCH populations south of Highway 380 in New Mexico on public lands administered by the BLM and surrounding areas are near extirpation. Intensive spring lek surveys on the Carlsbad BLM Resource Area detected only one remaining active lek (T. Allen, BLM, personal communication). Best et al. (2003) concluded anthropogenic factors have rendered LPCH habitat south of Highway 380 inhospitable for long-term survival of LPCH in extreme southeastern New Mexico. Similarly, Department survey data suggest quality of habitat may be limiting the recovery of these populations (Appendix I). Long-term declines coupled with habitat fragmentation and other factors (including drought) demonstrate the need for additional management and conservation efforts to reverse this downward trend. As a result, the Carlsbad BLM is currently proposing modifications to previous policies that stipulate conservation measures limiting oil and gas development and disturbances to previously occupied habitat. In addition to these protective measures, recent landscape scale analysis has identified 17 areas (113,053 acres) with habitat characteristics favorable for LPCH on public lands administered by the Carlsbad BLM (T. Allen, BLM, personal communication). These areas are considered crucial for the future recovery of LPCH in the Carlsbad region and may serve as locations for habitat restoration and eventual species reintroduction efforts.

## Statewide Population Estimate

Throughout New Mexico, > 425 active leks have been identified from 2001-2005. For the purposes of this report, a lek is defined as a traditional display site with 2 or more males that have been recorded at least 1 year out of the last 5 (LPC/SDL Working Group 2005, unpublished report). By accumulating all available lek counts and the number of leks identified since 2001 (Table 2.2), the mean lek size for active leks was calculated and a conservative *ad hoc* spring breeding population estimate was derived. Analysis indicated the statewide population of LPCH in New Mexico is approximately 4,800 males or a minimum breeding population of about 9,600 birds. Although there is no objective definition of what constitutes a “viable” population, numerous studies indicate that a population of 5,000-50,000 is desirable for long-term persistence (Frankham et al. 2002). Based on all currently available information, the Department believes that the occupied range of LPCH (~2,220 square miles) will support a viable population of LPCH and the species is, therefore, unlikely to be threatened with extirpation in New Mexico.

Statewide population estimates were based on lek counts, which are commonly used as an index of population trends; however, their validity to estimate population size has often been questioned (Beck and Braun 1980, Applegate 2000, Anderson 2001). Lek count-derived population estimates have no measure of precision and may underestimate the population. The statewide estimate of the breeding LPCH population in New Mexico assumes that all known leks are surveyed within the area of interest, almost all birds counted on leks are males, and a 1:1 sex ratio. Although population estimates based on lek counts contain significant uncertainty (and should be interpreted with caution), the amount of effort and economic resources required to generate population estimates using other methods (e.g., mark-resight techniques) limits the feasibility of these techniques (Walsh 2002). Despite the limitations of current Department survey efforts, information on lek distribution and activity are based on the best available data and represent the most complete database available for LPCH in New Mexico.

## 2.4 Population Reintroduction

LPCH have been transplanted into Colorado at least ten times (1961-1996), usually into known historical range or occupied habitats, although at least two transplants were to locations outside of their non-historical range. None were successful in establishing or increasing populations (Giesen 1998). New Mexico transplanted LPCH into uninhabited ranges in the 1930s and 1940s, but efforts were unsuccessful in establishing populations (Snyder 1967). Attempts to re-establish LPCH in Texas and Oklahoma have also failed (Taylor and Guthery 1980, Horton 2000).

The Department recognizes that identifying and protecting remaining LPCH populations and important habitat areas are priorities for immediate action in southeast New Mexico. If successful, captive propagation and/or transplanting might increase the effectiveness of other conservation and recovery efforts, while providing insurance against catastrophic declines. Establishing reserves and reintroducing LPCH populations in southeastern New Mexico might expand the occupied range of the species, and are necessary components of

LPCH recovery. However, ensuring genetic diversity in any re-established population must be a key consideration. Translocations, or other methods for restoring extirpated populations, need to be evaluated. Having a capacity to carry out captive propagation and release may, in the long term, enhance the benefits of habitat protection and help facilitate population recovery throughout the historic range of LPCH.

Table 2.2. Number of active leks detected and LPCH counted in New Mexico, 2001-2005.

Parameter	Year				
	2001	2002	2003	2004	2005
<b>NMDGF</b>					
No. leks detected	121	172	150	170	189
No. leks counted	49	64	65	69	88
No. birds counted	389	652	684	621	825
Mean birds/lek	7.94	10.19	10.52	9.00	9.38
<b>BLM<sup>1</sup></b>					
No. leks counted	27	34	37	48	64
No. birds counted	213	365	438	415	559
Mean birds/lek	7.89	10.74	11.83	8.65	8.73
<b>Private Lands<sup>2</sup></b>					
No. leks counted	35	46	59	57	56
No. birds counted	429	566	718	547	506
Mean birds/lek	12.26	12.30	12.17	9.60	9.04
<b>Totals</b>					
No. leks	183	252	246	275	309
No. birds	1,031	1,583	1,840	1,583	1,890
Mean birds/lek	9.36	11.08	11.51	9.08	9.05

<sup>1</sup>Based on annual surveys conducted on the Caprock Wildlife Habitat Area by the BLM Roswell Field Office (E. Jaquez, BLM, personal communications).

<sup>2</sup>State Game Commission Regulation 19 NMAC 33.4 requires locations of LPCH found on private lands be kept strictly confidential.

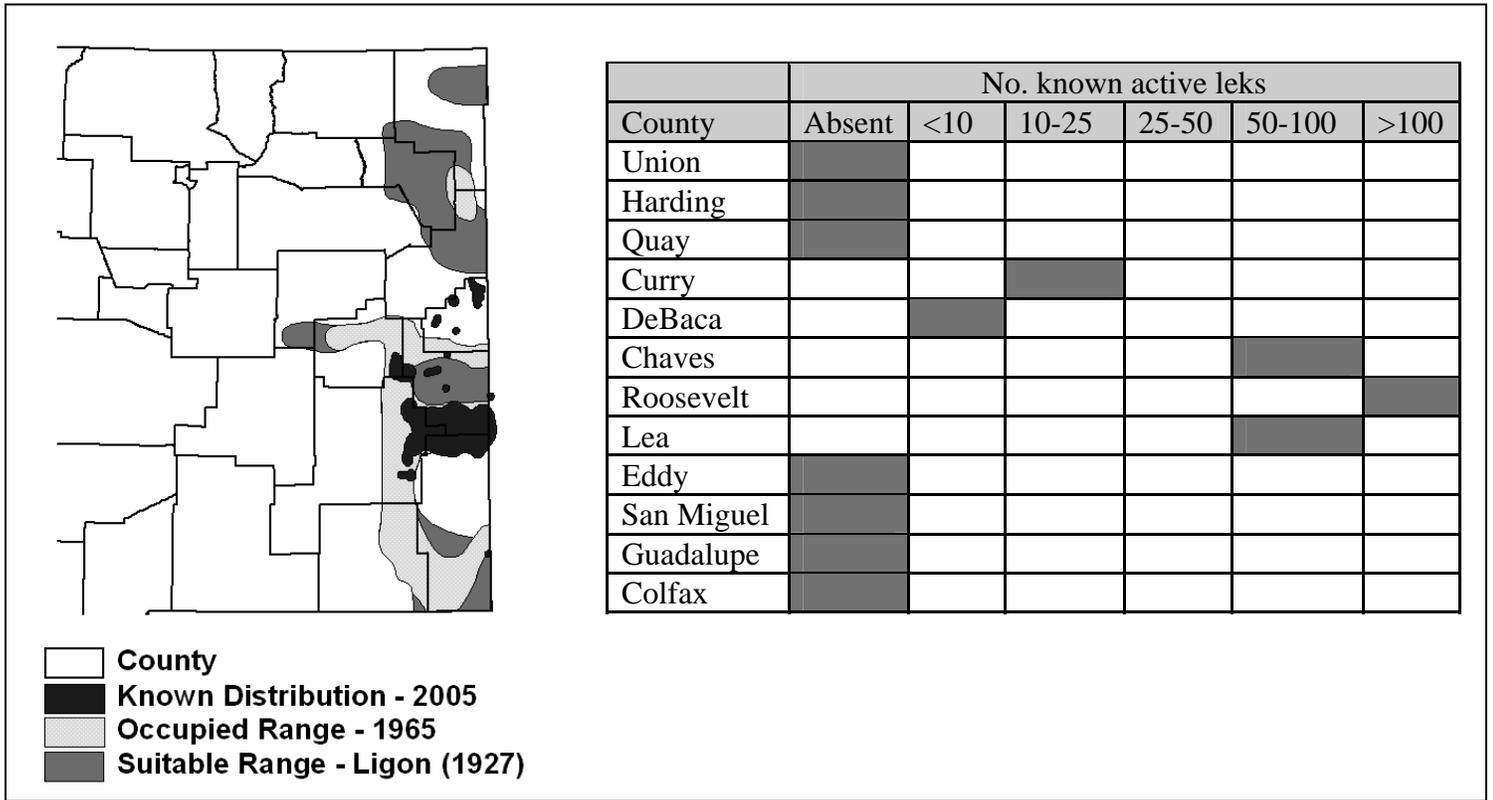


Figure 2.4. Known distribution of LPCH in eastern New Mexico, 2005.

**CHAPTER 3. FACTORS AFFECTING LESSER PRAIRIE-CHICKENS AND LESSER PRAIRIE-CHICKEN HABITATS**

**3.1 Land Ownership**

Currently, 59% of historic LPCH range in New Mexico is privately held. With exception to federal holdings managed by the Department of Energy in Eddy County, Department of Defense in Roosevelt County, and State Game Commission-owned PCAs administered by NMDGF, the BLM, U.S. Forest Service, and New Mexico State Land Office (SLO) manage the remaining 40 percent of historical and occupied range of LPCH in eastern New Mexico (Table 3.1).

Table 3.1. Land ownership status within the historic and occupied range of the LPCH in New Mexico (adapted from Bailey 1999).

Portion of LPCH range	LPCH range (mi <sup>2</sup> )	Land Ownership (%)			
		Private	State Trust	BLM	Other
Northeast	1,292	78	22	--	--
East-central	4,291	78	16	4	1
Southeast	3,062	24	23	53	< 1
<b>Totals</b>	<b>8,645</b>	<b>59</b>	<b>19</b>	<b>21</b>	<b>1</b>

### 3.2 Current Land Uses

In a study assessing the status of nesting habitat for LPCH in New Mexico, Bailey et al. (2000) identified ~7,353 square miles of historic LPCH range, which included parts of Chaves, Roosevelt, Lea, and Eddy counties. The study area represented about 77 percent of the LPCH range in east-central and southeast New Mexico. Results indicated nearly 85 percent of the study area was in rangeland, whereas land devoted to crop production was only 12 percent. Current estimates of change in rangeland acreage between 1997 and 2002 for counties within LPCH range in eastern New Mexico showed no significant change in landuse, although notable increases in acres of irrigated cropland were observed in Lea and Roosevelt counties (Table 3.2).

Lands enrolled in the CRP might provide an important management opportunity for increasing and improving LPCH habitat. LPCH have expanded their range in response to multiple-species native grass CRP stands in the central plains, particularly in west-central Kansas (Rodgers 2005, Rodgers and Hoffman 2005). About 70-80% of the original CRP seedings in eastern New Mexico consisted of dense, single-species stands of weeping lovegrass (*Eragrostis curvula*) or old world bluestem (*Bothriochloa bladhii*) (Table 3.3). A few counties seeded mixtures that included sand dropseed (*Sporobolus cryptandrus*), sideoats grama (*Bouteloua curtipendula*), and blue grama (*B. gracilis*). LPCH populations have generally not increased in response to the monocultures noted, but have increased slightly in range and population in an area outside what Ligon (1927) described as suitable LPCH range in northern Curry County where mixed stands are more prevalent (D. M. Davis, NMDGF, unpublished data) (Figure 2.4).

Table 3.3. Number of acres enrolled in CRP in New Mexico within the range of LPCH (from Bailey 1999).

<b>County</b>	<b>CRP (acres)</b>	<b>Percent planted to native grasses</b>
Curry	207,500	50
DeBaca	4,661	100
Harding	14,520	100
Lea	35,200	43
Roosevelt	170,600	41
Quay	105,376	100
Union	24,033	98
<b>Totals</b>	<b>561,890</b>	

### 3.3 Habitat Quality

The quality of available habitat contributes to the effectiveness of many of the other factors regulating LPCH populations. Disease, predation, hunting, and disturbances are less likely to affect populations when habitat quality is high and both the birds and the population are quick to recover. Population impacts from unfavorable weather conditions are also somewhat ameliorated by having high quality habitats. Managing for quality habitats, while maintaining and restoring habitat quantity, are likely the two most important factors for long-term sustainability of LPCH populations. As populations become increasingly fragmented and isolated, more information will be needed to assess genetic variability, the role of dispersal on metapopulation dynamics, minimum viable population size, and minimum habitat patch size needed to ensure population viability in eastern New Mexico (Giesen 1998).

Table 3.2. Trends in land use in eastern New Mexico, 1997 and 2002 (National Agriculture Statistics Service 2004).

	<b>New Mexico</b>	<b>Chaves</b>	<b>Curry</b>	<b>DeBaca</b>	<b>Eddy</b>	<b>Harding</b>	<b>Lea</b>	<b>Quay</b>	<b>Roosevelt</b>	<b>Union</b>
<b>Total cropland (acres)</b>										
1997	2,307,719	(D) <sup>1</sup>	461,371	20,030	73,393	20,181	112,679	253,383	363,351	89,169
2002	2,575,107	100,625	497,232	21,739	12,921	34,431	127,764	246,558	396,207	126,313
<b>Irrigated land (acres)</b>										
1997	851,735	73,714	92,519	9,809	53,356	(D)	42,529	40,885	70,237	46,597
2002	844,799	69,789	95,103	8,061	45,489	(D)	60,590	29,684	90,628	49,428
<b>Beef cows (farms)</b>										
1997	7,774	255	209	117	217	154	315	399	289	333
2002	5,571	227	181	103	182	97	232	302	260	265
<b>Milk cows (farms)</b>										
1997	620	55	35	8	30	4	28	18	44	22
2002	377	52	31	5	20	1	24	7	46	12
<b>CRP (acres)</b>										
1997	484,629	3,157	146,978	4,046	2,449	17,563	31,265	85,504	112,296	29,992
2002	545,884	2,947	197,388	2,927	1,238	13,322	28,899	102,613	141,633	25,620

<sup>1</sup>(D) indicates data was withheld to avoid disclosing information for individual farms.

## **CHAPTER 4. POTENTIAL THREATS TO NEW MEXICO LESSER PRAIRIE-CHICKENS**

### **4.1 Habitat Fragmentation**

Habitat fragmentation occurs when large areas of habitat are broken up into smaller, isolated patches of habitat. Because suitable habitat for LPCH has been lost due to conversion to agriculture and modified through grazing practices and other factors, much of the remaining suitable habitat is fragmented (Crawford 1980, Braun et al. 1994). Fragmentation may threaten local LPCH populations through several means: habitat juxtaposition and remaining patches of rangeland may be smaller than necessary to support populations (Samson 1980); necessary habitat heterogeneity may be lost; habitat between patches may accommodate high densities of predators; and ability to move and/or disperse among suitable patches of habitat may decrease (Wilcove et al. 1986, Knopf 1996).

Direct conversion of rangeland to some other land use is the most extreme of a number of developments that may result in fragmentation of LPCH habitat. Other sources of impact on the natural structure and continuity of shinnery oak and sand sage-grassland habitats include infrastructure associated with resource extraction, roads, power lines, fences, buildings, and tree plantings or windbreaks. As a group, prairie grouse may be particularly sensitive to habitat fragmentation due to their short dispersal distances and landscape scale habitat requirements (Braun et al. 1994). Recent LPCH declines in the southern portion of its range in New Mexico, although probably at least in part drought-related, have led to concern over the effects of fragmentation caused by oil exploration and drilling. While it is often difficult to describe cause-and-effect linkages between specific sources of fragmentation and eventual population responses, recent studies have found LPCH population declines in Oklahoma and New Mexico to be associated with several measures of overall habitat fragmentation, including patch size, edge density, and total rate of landscape change (Woodward et al. 2001, Fuhlendorf et al. 2002).

Fences and power lines may also be a significant cause of direct mortality by collision (Bidwell et al. 2003). In Oklahoma, the increased extent of fencing was associated with higher mortality of female LPCH and 4 of every 10 LPCH deaths was attributed to collisions with a fence, powerline, or vehicle (Patten et al. 2005). Ligon (1951) expressed concern that spread of these features in eastern New Mexico might severely limit LPCH populations, however, the full extent of collision mortality is not known and is difficult to measure.

Impacts of fragmentation are cumulative, and are often mediated by behavioral responses to whatever change is occurring on the land. A growing body of evidence suggests that LPCH actively avoid areas of human activity, noise, and proximity to vertical structure that may provide hunting perches for raptors, particularly during nesting (Robel et al. 2004). Data from several studies indicate that prairie grouse, including LPCH, may avoid or nest at reduced rates in areas near roads, power lines, compressor stations, and inhabited dwellings (Braun et al. 2002, Lyon and Anderson 2003, Pitman 2003, Robel et

al. 2004). Recent studies in Kansas showed that LPCH seldom nest or raise their broods within 581 feet of oil or gas wellheads, 1,191 feet from electrical transmission lines, 2,579 feet of improved roads, and 4,114 feet from buildings (Robel et al. 2004, Pitman et al. 2005). The authors calculated that nesting avoidance at these distances would effectively eliminate a large percentage of available nesting habitat over a three-county area in southwestern Kansas. Thus, the presence of these features may result in LPCH abandonment of areas containing a high percentage of otherwise suitable habitat, effectively increasing the impact of these features far beyond their physical footprint.

## **4.2 Livestock Grazing**

Grazing is one of the dominant land uses on public and private lands throughout the range of LPCH. The evolutionary history of the mixed-grass prairie resulted in endemic birds species adapted to a mosaic of lightly to heavily grazed areas (Bragg and Steuter 1996, Knopf and Samson 1997). Grazing is essential to maintain the health of native grasslands and areas moderately and lightly grazed areas are necessary on a landscape scale. In some areas within LPCH range, where heavy grazing has removed tall- and mid-grass cover, insufficient amount of lightly grazed habitat is available to support successful nesting (Crawford 1980, Jackson and DeArment 1963, Davis et al. 1979, Taylor and Guthery 1980, Davies 1992). Uniform or widespread livestock grazing of rangeland to a degree that leaves less than adequate residual cover remaining in the spring is considered detrimental to LPCH populations (Bent 1932, Davis et al. 1979, Cannon and Knopf 1980, Crawford 1980, Bidwell and Peoples 1991, Riley et al. 1992, Giesen 1994b), because grass height is reduced below that necessary for nesting cover and desirable food plants are markedly reduced. Residual cover at and around nests is thought to increase nest success because the nest is better concealed from predators (Davis et al. 1979, Wisdom 1980, Riley et al. 1992, Giesen 1994b).

The impacts of grazing on LPCH can vary widely, depending on climatic conditions, the state or health of range vegetation, and the type of grazing regime utilized. Drought tends to magnify grazing impacts, as both processes reduce plant cover. When forage is reduced by drought, what remains tends to be grazed more heavily unless animal numbers are reduced. As a result, some grazed areas may supply adequate habitat during periods of normal rainfall, but may be unable to support LPCH during droughts (Merchant 1982). Intensive and/or persistent grazing may reduce or eliminate residual tallgrass cover needed for nesting (Davis et al. 1979, Riley et al. 1992). Heavy grazing that repeatedly interrupts plant succession over a broad area may result in the conversion of tallgrass prairie to shortgrass or forb-dominated habitat (Litton et al. 1994) or shrub-dominated landscapes.

## **4.3 Changing Land Uses**

Change in land use refers to a change from wildlife habitat to another land use that represents a long-term or permanent change. Many authors cite conversion of native sand sage and shinnery oak-grasslands to areas of cultivation as an important factor in the decline of LPCH (Copelin 1963, Jackson and DeArment 1963, Crawford and Bolen

1976, Crawford 1980, Taylor and Guthery 1980a, Braun et al. 1994). Landscapes in which more than 37 percent of native rangeland has been lost may be incapable of supporting LPCH, and populations have declined in areas with only 20 percent rangeland conversion (Crawford and Bolen 1976). In Kansas, LPCH avoided nesting within 300-400 yards of fields with center-pivot irrigation, effectively increasing the impact footprint of agricultural lands (Robel et al. 2004). Irrigation drawing on the Ogallala aquifer has resulted in extensive conversion of LPCH rangelands to croplands in Texas and Oklahoma, but this has not been considered a major factor in New Mexico (Leslie et al. 1999, Massey 2001). In recent years, however, areas of LPCH habitat in Curry and Roosevelt counties have been plowed to grow crops or forage for a rapidly growing dairy industry in eastern New Mexico.

Tree plantings and windbreaks further fragment remaining grasslands and create abrupt boundaries that can intensify edge effects. Additionally, the suppression of ecological processes (e.g., fire) has allowed an increase in woody encroachment into grassland habitats (Bidwell et al. 2003). Studies indicate birds are sensitive to small increases (1-2%) in the amount of tree cover within landscapes and woody vegetation had a deleterious effect on prairie grouse occurrence, density, and/or nesting success (Berger and Baydack 1992, McKee et al. 1998, Merrill et al. 1999, Hanowski et al. 2000, Niemuth 2000, Fuhlendorf et al. 2002).

Shinnery oak is a critical component of LPCH habitat in much of southeastern New Mexico, providing both escape cover and a winter food source (Riley et al. 1992, Giesen 1998). Herbicides and defoliant are sometimes used to reduce shinnery oak cover and increase forage production. The effects of this practice on LPCH habitat may be highly variable, depending on the manner and extent of treatment. Past widespread application of herbicides, such as Tebuthiuron, has eliminated shinnery oak over large areas (156 square miles) administered by the BLM, resulting in extensive loss of habitat (Peterson and Boyd 1998). However, limited reduction in densities of shinnery oak and sand sage after herbicide applications did not reduce LPCH populations if adequate cover and foods remained (Donaldson 1969, Olawsky and Smith 1991) and subsequent livestock management allowed an increase in tall grasses (Davis et al. 1979, Doerr and Guthery 1983). In some locations, competition from shinnery oak impedes restoration of grasses and forbs needed for LPCH nesting and brood-rearing. When this occurs, limited use of chemical treatment can help achieve vegetative standards for quality habitat (C. Dixon, Wildlife Plus Consulting, personal communication). When carried out on a limited basis, shinnery oak control may help increase tallgrass cover associated with high quality habitat and LPCH nesting success.

#### 4.4 Predation

LPCH have a short life expectancy and, as with most prairie grouse, eventually die from predation (Bergerud 1988). A recent study in New Mexico found 43% of mortalities were attributed to raptor predation and 30% were attributed to mammalian predators (GMSARC 2005, unpublished data). Rough-legged hawk (*Buteo lagopus*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), Cooper's hawk (*Accipiter*

*cooperii*), northern harrier (*Circus cyaneus*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), coyote (*Canis latrans*), and badger (*Taxidea taxus*) have all been identified as predators of LPCH adults and chicks (Campbell 1950, Copelin 1963, Davis et al. 1979, Sell 1979, Ahlborn 1980, Merchant 1982, Haukos 1988). Nesting hens, eggs, and chicks are most vulnerable to predation, especially where nesting cover and brood habitat are inadequate to provide for concealment and escape. Predators of nests include Chihuahuan raven (*Corvus cryptoleucus*), striped skunk (*Mephitis mephitis*), ground squirrels (*Spermophilus spilosoma*), and bullsnakes (*Pituophis melanoleucus*), as well as coyotes and badgers (Davis et al. 1979, Giesen 1998).

Predation of prairie grouse is often considered a consequence of habitat quality and juxtaposition, prairie grouse density, and predator numbers (Schroeder and Baydack 2001). Inadequate habitat quality may increase the predation risk for birds attempting to locate escape cover (Svedarsky 1988, Connelly et al. 1991, Riley et al. 1992, Gregg et al. 1994). Numerous studies have found higher rates of nest predation on European grouse species in fragmented landscapes containing more edge and smaller patch sizes (Andren et al 1985, Andren and Angelstram 1988, Kurki et al. 1997). The introduction of trees, power lines, or other vertical structures into prairie habitats provides hunting perches for raptors and may indirectly increase raptor predation on LPCH (Bidwell et al. 2003).

Predator control has occasionally been used as management tool with the belief that reducing predator numbers can improve viability of prairie grouse (Batterson and Morse 1948, Lawrence 1982). Although some research has demonstrated that reductions in predators can increase grouse recruitment (Parker 1984, Marcstrom et al. 1988, Baines 1990), most current management recommendations encourage indirect management of the grouse-predator relationship by manipulating habitat quality. However, if habitats in eastern New Mexico become more fragmented and altered, particularly in the southern periphery of LPCH range, and populations of LPCH become increasingly threatened it might become necessary to consider predator control as an additional management option.

#### **4.5 Hunting and Poaching**

Legal hunting of LPCH in New Mexico was discontinued in 1996; however, the Department does not attribute overutilization through recreational hunting as a primary cause of LPCH population declines in New Mexico. However, given the remaining LPCH populations are small, isolated, and naturally exhibit a clumped distribution on the landscape, concern exists that local, small populations may be vulnerable to concentrated hunting pressure (Taylor and Guthery 1980a). Hunting can provide information on LPCH populations not available through other means. Wings collected from hunters can provide valuable population information on reproductive effort and recruitment into the population. Thus, hunting seasons and regulations could be established to optimize the information gathered by the Department.

Poaching is the illegal hunting of a game species. Because this activity often takes place during seasons of the year when the birds are vulnerable because of some biological requirement in their life history, the potential exists for long-term poaching to cause a population decline. The lack of survey data to assess the level of poaching and its effects makes it difficult to estimate the level of impact that poaching may have in New Mexico.

#### 4.6 Disturbance

Disturbance refers to direct interference with LPCH, rather than a habitat disturbance, and can include many types of disruption. Increased traffic on a road that formerly had little traffic and is located near a lek is an example of disturbance that may cause the birds to abandon a lek. The impact of military flyovers has been raised as a concern, but studies have not been conducted to assess if impacts actually occur. The amount of LPCH mortality due to vehicular traffic is unknown. Off-road vehicle (ORV) use is largely unrestricted across the LPCH range in New Mexico. ORVs are used both by recreationists and by hunters seeking access to hunting areas. Construction of roads for energy development may open up areas to increased ORV use. While data on ORV impacts are lacking, their presence clearly has the potential to disturb lekking and nesting activities. However, designating areas specifically for these recreational activities will minimize the disturbance and potential habitat degradation by confining the disturbance to a relatively small area on the landscape.

One new factor that has the potential to negatively effect individual populations is the growing occurrence of recreational viewing of LPCH leks during the breeding season. The site-specific impacts of recreational observations on LPCH at leks are currently unknown. However, the disturbance effects are likely to be minimal at the population level if disturbance is avoided by observers remaining in vehicles or blinds until LPCH naturally disperse from the lek and if observations are confined to a limited number of days and leks. Very little work has been done to document these types of impacts or the extent to which they affect populations.

#### 4.7 Disease

Giesen (1998) reported no available information on ectoparasites or infectious diseases in LPCH, although several endoparasites including nematodes and cestodes are known to infect the species (Addison and Anderson 1969, Pence and Sell 1979, Robel et al. 2003). In a recent study in New Mexico, LPCH tested positive for *Eimeria* and *Plasmodium* species, however the parasite load was not perceived as a significant contributor to LPCH mortality (Smith et al. 2003). In Texas, Peterson et al. (2002) documented the first incidences of infectious bronchitis antibodies in LPCH. Hagen et al. (2002) found low levels (<5%) of *Mycoplasma* spp. antibodies in LPCH sera in Kansas and also concluded that such levels were not limiting to populations. The significance of the parasite infestations noted in the literature is unknown. While density-dependent transmission of disease is unlikely to have a significant effect on LPCH populations, Mote et al. (1999) noted that given the generally small and scattered nature of LPCH populations, a disease transmitted independently of population density could have drastic effects.

#### 4.8 Climate and Weather

Drought may impact LPCH through its effect on seasonal growth of vegetation necessary to provide nesting and roosting cover, food, and escape from predators (Merchant 1982, Peterson and Silvy 1994, Morrow et al. 1996). Major droughts of the 1930s, 1950s, and early 1990s markedly reduced LPCH populations across their range (Giesen 1998). Increased annual precipitation resulted in small population increases in mid-1980s, but drought conditions in early 1990s caused noticeable range-wide declines (Giesen 1998). The sensitivity of LPCH to drought was discussed by Crawford (1980) and Hamerstrom and Hamerstrom (1961); home ranges may be larger in drought years (Copelin 1963, Merchant 1982), and recruitment may be less likely after drought years (Merchant 1982, Morrow 1986, Giesen 1998). Southern portions of the range, which on average receive less total precipitation (e.g., the Carlsbad region), are impacted more frequently and more severely by drought. LPCH populations in these areas may have always been smaller and more variable than those farther to the north, although population data are insufficient to say this with certainty. Along with other prairie grouse, LPCH have a high reproductive potential in years of adequate conditions. Thus, drought conditions are unlikely to be the sole causative factor in long-term LPCH population declines, although the effects of drought on population growth rate may be significant in small, fragmented populations.

#### 4.9 Oil and Gas Development

Energy exploration and development occur on public and private surface lands throughout the range of LPCH. Although the effects of oil and gas developments on LPCH are poorly understood, recent studies have suggested that development of oil and gas resources negatively impacts prairie grouse, particularly during the breeding season (Lyon and Anderson 2003, Pitman et al. 2005). LPCH require large contiguous tracts of prairie ecosystems to fulfill their life history requirements. The cumulative impacts of roads and increased traffic, well pads, pipelines, overhead transmission lines, compressor stations, and production facilities not only result in direct habitat loss but fragment remaining suitable habitat deterring use by LPCH (Pitman et al. 2005). Prairie grouse avoid areas near roads, power lines, and other man-made infrastructures (Pitman et al. 2005). The effect of daily vehicular traffic associated with maintenance of oil and gas operations along these road networks can also impact breeding activities and may further decrease the availability of habitat (Braun et al. 2002). Collisions with overhead transmission lines cause direct mortality to LPCH and may further limit LPCH populations (Bidwell et al. 2003). Construction of transmission lines also provides perches for various raptor species, which could potentially increase the mortality rate of LPCH (Bidwell et al. 2003). Noise associated within pumping and oil field activities may impact breeding activities if mating display vocalizations are disrupted by background sounds. Further, lek attendance is lower on breeding grounds located in close proximity to active mineral resource developments compared to less disturbed lek sites (Braun et al. 2002). If noises associated with pumping and oil field activity deter recruitment of yearling males to breeding grounds, leks may become extinct (Braun 1986).

Studies to determine if noise from oil and gas exploration may have played a role in the abandonment of a number of historically active lek sites in the Carlsbad area show that abandoned lek sites were exposed to higher ambient sound levels than active sites (Hunt 2004). The same study also reports a significantly higher number of operating wells within one mile of abandoned lek sites. Whether this pattern of lek abandonment reflects sensitivity to noise or some other form of disturbance associated with intensive oil and gas development, or is a response to factors not associated with drilling, remains unknown. However, all of these studies emphasize the importance of taking behavioral avoidance into consideration when assessing development impacts on LPCH habitat.

In recognition of the potential impacts of resource extraction on LPCH populations, local and seasonal restrictions on oil and gas developments have been placed on public lands administered by the BLM to protect LPCH (BLM 1997). Drilling and 3-D geophysical exploration is not allowed in LPCH habitat between March 15 and June 15 each year. During that period, other activities that produce noise or involve human activity are prohibited between 3:00 and 9:00 a.m.; however, this does not include around-the-clock operations. In addition, no new drilling is allowed within 200 m of all known leks, although exceptions to these requirements will be considered. In addition to these protective measures, the SLO withdrew >100,000 acres (within 1.5 miles of active leks) from oil and gas leasing until January 2007.

#### **4.10 Wind Energy Development**

Presently, little is known on how wind power developments affect LPCH and/or LPCH habitats. Areas within eastern New Mexico are currently being monitored for suitability as wind energy sites. These developments include the turbine to harness the energy, as well as access to the sites, and transmission line connections to substations or other existing power grids. Physical disturbance affected by the construction of turbines, turbine noise, and physical movement of turbines during operation have the potential to disturb nesting LPCH (Robel et al 2004). However, behavioral avoidance of these facilities by prairie grouse has the potential to exacerbate the negative impacts of project area. The effects of habitat fragmentation may indirectly affect local LPCH populations by decreasing the area of habitat available for nesting and brood-rearing (Pitman et al. 2005). The behavioral response of the greater prairie-chicken is similar to that of the LPCH and it is predicted that nesting and brood-rearing hens of both species will avoid large wind turbines by at least a one-mile radius (Robel et al. 2004). Fragmentation and changes in habitat structure may increase the amount of edge, which serve as lanes for terrestrial predators (Kuehl and Clark 2002), and are consequently avoided by nesting prairie grouse (Robel 2002a, Pitman et al. 2005). In addition to the effects of habitat fragmentation, the avoidance of vertical structures (Anderson 1969, Manes et al. 2002) and human disturbance by prairie grouse may further impact LPCH movements and habitat use (Robel 2002a, b). Therefore, this type of land use change has a variety of potential impacts to LPCH.

#### **4.11 Population Isolation**

Continued habitat loss and fragmentation may result in small, isolated LPCH populations at risk of losing genetic variation. Genetic diversity is necessary for a population to respond to environmental change, thus a loss of genetic variation may jeopardize the persistence of fragmented populations (Shaffer 1981). Populations, such as LPCH, that have undergone large decreases in population size are likely to lose genetic variation (Nei et al. 1975, Maruyama and Fuerst 1985). In a range-wide evaluation of LPCH, birds from New Mexico had the fewest haplotypes and were markedly different from other populations, suggesting that LPCH in New Mexico have been isolated from other populations across their range (Hagen 2003). In addition, estimates of genetic diversity within 4 semi-isolated leks from the Caprock Wildlife Habitat Management Area in New Mexico suggested increased inbreeding leading to an increase in homozygosity within the leks studied (Bouzat and Johnson 2004). Although no deleterious effects to demographic rates have been documented in New Mexico populations (GMSARC, unpublished data), a loss of genetic diversity may be associated with inbreeding and a reduction in reproductive fitness (Bouzat et al. 1998 a, b). Resistance to disease and ability of populations to respond to environmental perturbations may also decrease with the loss of genetic variation (Lacy 1997). Thus, loss of genetic variation may negatively impact the long-term viability of LPCH populations in New Mexico.

Presently, the Department is conducting studies to address the effects of genetic variation on LPCH population structure in eastern New Mexico. Measures of genetic variation will permit us to evaluate the degree to which sparse and scattered populations in New Mexico have experienced a loss of genetic diversity through processes such as genetic drift or inbreeding depression. Further, assessing the genetic variation of LPCH will assist managers in evaluating whether transplanting birds from populations within the core of LPCH distribution in east-central New Mexico or supplementing New Mexico populations with birds from populations with higher genetic variability outside New Mexico (genetic introgression) is necessary.

### **CHAPTER 5. CONSERVATION STRATEGIES**

#### **5.1 Statewide Strategies**

The Department completed management plans for LPCH in New Mexico in 2001 and has made significant progress toward implementing long-term LPCH conservation efforts (Appendix II). As part of the Department's outreach efforts, concerned officials with NMDGF, in collaboration with the USFWS, BLM, SLO, and Wildlife Management Institute, proposed that a "Southeast New Mexico Lesser Prairie-Chicken Working Group" of appropriate public and private stakeholders begin meeting to devise a conservation strategy for the LPCH in southeastern and east-central New Mexico. The organizers hoped the various constituencies would be able to negotiate a collaborative plan that would, when implemented, improve the status of the species such that federal listing would no longer be warranted, while protecting the interests of the participating

parties. In 2005, the Working Group adopted a conservation strategy and recommendations which laid out general approaches, priorities and parameters for achieving the goal of LPCH conservation and recovery while maintaining economic values and traditional land uses. The strategy document outlines and prioritizes a variety of recommended programs, projects, and practices for reducing threats to the LPCH while maintaining other uses of the land.

Presently, the BLM is developing a resource management plan amendment of the 1988 Carlsbad Resource Management Plan (RMP), including its 1997 amendment, and the 1997 Roswell RMP. This RMP amendment (RMPA) maintains and protects existing habitat for LPCH and enhances habitat for LPCH while simultaneously permitting the multiple uses and actions on public land in southeast New Mexico. The Planning Area amounts to about 2 percent of New Mexico and is located in the southeastern part of the State, comprising 1,852,946 acres of private, federal and state trust lands (Table 5.1).

Table 5.1. Land ownership in the RMP Planning Area.

<b>Ownership</b>	<b>Acres</b>	<b>Percent of planning area</b>
Bureau of Land Management	847,491	45.7
Department of Energy	10,244	0.7
State Trust	307,129	16.6
Private	686,082	37.0
<b>Total Planning Area</b>	<b>1,852,946</b>	<b>100.0</b>

## 5.2 Range-wide Strategies

In 1997, a multi-agency LPCH Interstate Working Group (LPCIWG) was established to prepare a range-wide conservation strategy and coordinate efforts among the five states where LPCH are found today. Recently, Texas Parks and Wildlife Department filled a full-time staff position to serve as the LPCH Program Coordinator to lead the coordination of an Interstate LPCH Plan (also known as the LPCH Conservation Initiative) for the LPCIWG and its partners. The LPCH Conservation Initiative will be incorporated into a Prairie Grouse Management Plan for North America (PGMP). The PGMP is a collaborative effort between various state, provincial, and federal agencies and is being led by the North American Grouse Partnership (NAGP). The PGMP will emphasize the restoration and enhancement of grassland habitats and set goals for self-sustaining populations of prairie grouse, including LPCH. Separate from the PGMP, the NAGP is also directing the synthesis of a comprehensive North American Grouse Management Strategy. This Strategy strives to link the habitat needs and existing management plans of all continental species of grouse.

## 5.3 Conservation Actions Currently in Progress

The Department is working cooperatively with the USFWS, Natural Resources Conservation Service (NRCS), and private landowners in eastern New Mexico to

facilitate partnerships to bear or share the costs of maintaining or improving LPCH habitat on private lands. To date, >130,000 acres of private rangelands in New Mexico has been committed to conservation actions that will enhance or recover rangeland condition to benefit LPCH for at least 10 years (Table 5.2).

In 1999, the NRCS approved a landowner initiated LPCH Geographic Priority Area (GPA) under the Environmental Quality Improvement Program (EQIP) to assist landowners with habitat improvements for LPCH on private lands in Curry, Roosevelt, northern Lea, and eastern Chaves counties. Funding was approved for \$250,000 in financial support to be implemented over 200,000 acres of private rangelands occupied by LPCH in eastern New Mexico. In addition the NRCS allocated funding in 2003 to implement the Grassland Reserve Program (GRP) in LPCH habitat.

Approximately \$1.3 million has been committed to habitat improvement projects for the LPCH with private landowners through the Landowner Incentive Program (LIP). An additional \$153,000 was received for grassland habitat management and playa lake conservation on the high plains of eastern New Mexico and \$160,000 was awarded to multiple counties in eastern New Mexico and the Texas Panhandle to enhance habitat for LPCH along the Canadian River through the Private Stewardship Grant Program (PSG).

In addition to conservation efforts on private lands, the SLO has withdrawn leasing of new oil and gas wells within 1.5 miles of active leks, affecting >100,000 acres of LPCH habitat. Currently, the Roswell District of the BLM maintains a large (~245,000 acres) LPCH Core Management Area (CMA) composed of several discreet land segments where no oil and gas leases have been issued since 1997. Also, the BLM is developing an ambitious habitat reclamation program in the shinnery oak-sand dune habitat complex (~20,000 acres), focusing reclamation efforts on lands disturbed by historic oil and gas exploration and development (e.g., access roads, well pads, and right-of-ways) in the Permian Basin of southeast New Mexico.

Table 5.2. Private rangelands enrolled in wildlife habitat incentive programs to benefit LPCH in eastern New Mexico, 1999-2005.

Year implemented	Cooperators	Program	No. acres enrolled	County	Conservation action
1999	USFWS, SLO, NRCS	Partners for Fish & Wildlife	500	Roosevelt	Native grass restoration; grazing management; pipeline
2000	USFWS	Partners for Fish & Wildlife	16,000	Roosevelt	Fencing; livestock water tanks; grazing plan
2001	NRCS	EQIP	1,042	Roosevelt	Fencing; pipeline, livestock water tank; prescribed grazing
2001	NRCS	EQIP	2,240	Roosevelt	Prescribed grazing
2001	NRCS	EQIP	4,600	Roosevelt	Prescribed grazing
2001	NRCS	EQIP	640	Roosevelt	Prescribed grazing
2001	USFWS	Partners for Fish & Wildlife	400	Roosevelt	Native grass restoration; livestock water tanks; wetland creation; fencing;

					grazing management
2001	NRCS	EQIP	1,030	Roosevelt	Prescribed grazing
2002	NRCS	EQIP	7,387	Chaves	Prescribed grazing
2002	NRCS	EQIP	4,000	Roosevelt	Brush control; fencing; pipeline; watering facility; prescribed grazing
2003	NRCS	EQIP	7,900	Roosevelt	Brush control; fencing; prescribed grazing; pumping plant; watering facility; water well; wildlife guzzler
2003	NMDGF	Wildlife Partnership Grant	50	Roosevelt	Grazing deferral; native shrub plantings
2003	SLO, NRCS	EQIP	640	Curry	Conversion of cropland to native grass
2003	SLO, NRCS, NMDGF	EQIP, Wildlife Partnership Grant	4,400	Roosevelt	Pipeline; wildlife guzzlers; native shrub plantings; fencing; prescribed grazing
2003	SLO, NRCS	EQIP	320	Chaves	Shinnery oak management
2003	NRCS	EQIP	23,920	Roosevelt	Fencing; pipeline; prescribed grazing; watering facility; water well
2003	NRCS	EQIP	14,560	Chaves	Brush control; diversion; fencing; prescribed grazing; pumping plant; watering facility
2004	NRCS	EQIP	4,883	Roosevelt	Water well; pipeline; watering facility; fencing; prescribed grazing
2004	NMDGF	Wildlife Partnership Grant	2000	Roosevelt	Pipeline; wildlife guzzlers; fencing; grazing deferral
2004	SLO, NRCS	EQIP	1,120	Chaves	Shinnery oak management
2004	USFW	Partners for Fish & Wildlife	800	Roosevelt, Chaves	Fencing; grazing deferral; cholla cactus control
2004	SLO	Land Maintenance Project (LMF)	985	Chaves	Mesquite control
2004	FSA	GRP	7,338	Roosevelt	30-year lease
2004	NRCS	GRP	5,120	Roosevelt	Permanent easement
2005	TNC		18,500	Roosevelt	Land acquisition
2005	USFWS, Grasslans Charitable Foundation	Partners for Fish & Wildlife, PSG	894	Roosevelt	Livestock water tanks; mesquite control; fencing; fence removal; grazing deferral; native grass restoration
2005	USFWS, Grasslans Charitable Foundation	PSG	160	Roosevelt	Native grass restoration; grazing deferral
2005	NMDGF	LIP	341	Roosevelt	Wildlife guzzlers; native grass restoration
2005	NMDGF	LIP	160	Roosevelt	Wildlife guzzlers; native grass restoration
2005	NMDGF	LIP	330	Curry, Quay	Native grass restoration; watershed restoration
2005	NRCS	EQIP	320	Curry	Grazing deferral
2005	NRCS, SLO	EQIP	320	Roosevelt	Grazing deferral
<b>Totals</b>			<b>132,900</b>		

#### **5.4 Habitat Acquisition**

Conservation of LPCH requires large, contiguous patches of native rangeland be protected and managed largely or exclusively as LPCH habitat. Along with on-the-ground efforts to improve the quality of rangeland habitat, NMDGF administers approximately 21,000 acres of State Game Commission-owned Prairie Chicken Areas dedicated to LPCH conservation (Table 5.3). However, such protected areas should not be limited to east-central New Mexico where stable LPCH populations currently exist. Habitat acquisition in areas where isolated and sparse and scattered populations occur is particularly important to prevent further fragmentation and to help maintain or re-establish habitat patches capable of supporting viable LPCH populations in these areas. Protected areas should form a broad network, linked wherever possible by habitat corridors to maintain or re-establish connectivity between populations. The basis of such a network already exists, consisting of designated BLM core management areas, PCAs administered by NMDGF, and private holdings on which significant habitat restoration is taking place. This includes the recent acquisition of 18,500 acres of prime LPCH habitat by the Nature Conservancy (TNC) in Roosevelt County, New Mexico. In addition, the Roswell BLM has proposed the acquisition of 640 acres of LPCH habitat, which would join two PCAs and establish approximately 4,800 acres of contiguous prairie for the management of LPCH.

Table 5.3. Status of New Mexico Department of Game and Fish State Game Commission-owned Prairie Chicken Areas, 2005.

PCA	Acres	Fence status	LPCH habitat condition	No. leks detected, 2005
Antelope Flats	320	Partial	Fair	--
Black Hills				7
(East and West)	1,320	Complete	Fair	
Bledsoe	200	Planned for FY06	Fair	5
North Bluit	1,280	Complete	Fair	6
South Bluit	640	Complete	Fair	4
East Bluit	80	Unfenced	Fair	2
Claudell	1,760	Complete	Good	4
Crossroads 1	2,320	Complete	Good	7
Crossroads 2	640	Complete	Fair	7
Crossroads 3	80	Complete	Poor	10
Crossroads 4	80	Complete	Poor	3
Crossroads 5	80	Unfenced	Poor	6
Farmer's	320	Planned for FY06	Fair	6
Gallina Wells 1	560	320 ac completed	Fair-Good	7
Gallina Wells 1A	160	Unfenced	Poor-Fair	3
Gallina Wells 1B	160	Unfenced	Poor	--
Gallina Wells 2	320	Complete	Fair-Good	3
Gallina Wells 3	480	Complete	Good	2
Gallina Wells 4	800	Complete	Good	5
Gallina Wells 5	1,280	Complete	Good	6
Gallina Wells 6	320	Complete	Good	5
Liberty	640	Complete	Good	2
Marshall	320	Complete	Fair-Good	3
Milnesand	7,189	Complete	Good	21
Ranger Lake <sup>a</sup>	80	Unfenced	Poor	--
Wayside	28	Complete	Fair	0
Pitchfork	40	Complete	Fair	2
Little Dipper	400	Planned for FY06	Fair	9
<b>Totals</b>	<b>21,897</b>			<b>135</b>

<sup>a</sup>Formerly Tatum

## 5.5 Education and Outreach

The annual High Plains Prairie-Chicken Festival in Milnesand, New Mexico is an effective venue for spreading awareness of LPCH conservation needs, reaching both residents of eastern New Mexico and several interest groups (including private landowners, state and federal agency personnel, bird watchers, and other environmental organizations) from other areas. The Festival provides opportunities for participants to view lekking LPCH while learning about the biology of the species, habitat requirements, and conservation status from local experts.

## 5.6 Research Activities

Research into the biology, habitat, and recovery of the LPCH are ongoing in New Mexico. These research projects address questions critical to the recovery of the LPCH and contribute to the net conservation of the species (Table 5.4).

Table 5.4. Research activities leading to the recovery of LPCH in eastern New Mexico, 2000-2005.

Study period	Cooperators	Project description
1999-present	Sutton Avian Research Center, NMDGF	Effects of shrub control and grazing on lesser prairie-chicken reproductive success
2000-present	Grasslans Charitable Foundation, Wildlife Plus Consulting, NMDGF, BLM	Grassland habitat restoration and management on the El Llano Estacado
2001-2003	Auburn University, BLM	Investigation into the decline of the lesser prairie-chicken in southeastern New Mexico – Dissertation
2001-2005	BLM, Earth Data Analysis Center (EDAC), Natural Heritage NM, NMDGF, SLO	LPCH habitat map for portions of eastern New Mexico
2002-2003	Sutton Avian Research Center, Oklahoma State University	Habitat use and growth and development of juvenile lesser prairie chickens in southeast New Mexico – Thesis
2004-present	NMDGF, Oklahoma State University	Evaluating genetic variation among lesser prairie-chicken leks in eastern New Mexico
2004-present	NMDGF, TNC, Grasslans Charitable Foundation	Lesser prairie-chicken productivity and breeding season habitat use in east-central New Mexico
2005-present	NMDGF, Natural Heritage NM, EDAC	Database management and GIS analyses for sand dune lizard and the lesser prairie-chicken
2005-present	Auburn University, BLM	Use of artificial leks to manipulate populations and to aid in transplanting populations of the lesser prairie-chicken onto lands administered by the BLM, CFO.

## CHAPTER 6. LISTING RECOMMENDATION

Under the WCA, “threatened species,” means any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range in New Mexico. “Endangered species,” means any species whose prospects of survival or recruitment within the state are in jeopardy due to any of the following factors:

1. the present or threatened destruction, modification or curtailment of its habitat;
2. overutilization for scientific, commercial, or sporting purposes;
3. the effect of disease or predation
4. other natural or man-made factors affecting its prospects of survival or recruitment within the state; or
5. any combination of the foregoing factors.

Over 90 percent of New Mexico’s remaining LPCH populations occur in east-central New Mexico, where the minimum spring breeding population is estimated to be about 3,800 birds. A conservative, *ad hoc* spring breeding population estimate indicated the statewide population of LPCH in New Mexico is approximately 4,800 males or a minimum breeding population of about 9,600 birds.

Although there has been some variation in survey effort, annual rates of change in population trend suggest overall LPCH numbers are stable or slightly increasing in the core of remaining LPCH populations in New Mexico. Department surveys have documented an increase in the number of LPCH leks detected and in numbers of birds observed on or near PCAs since 1996, possibly indicating a reversal of the downward trends of the early 1990s. A corresponding increase was observed on the Caprock Wildlife Habitat Area, where the number of active leks detected more than doubled from 1999 through 2005. Outside of the core area, LPCH have expanded their abundance and distribution, presumably in response to multiple-species native grass CRP stands, in northern Curry County where populations are considered sparse and scattered. Only 5 percent of the species overall range occurs on federal lands. In the southern periphery of the range, the BLM is coordinating restoration and reclamation of previously developed areas and is focusing on long-term planning efforts for re-establishing LPCH populations.

Over the course of the 6-year species status review, the Department has focused LPCH conservation efforts around coordinated support and on-the-ground management activities that have the greatest utility and most direct bearing on LPCH survival and conservation. A number of specific actions have been undertaken in New Mexico to reduce threats to LPCH and the habitats they occupy:

- NMDGF has dedicated two full-time personnel to LPCH management and conservation efforts;
- To date, >130,000 acres of private rangelands in New Mexico have been committed to conservation actions that will enhance or recover rangeland condition to benefit LPCH;

- Deferral of new mineral leasing on >100,000 acres of state trust lands in occupied LPCH habitat;
- In 2005, a map depicting the extent and location of LPCH habitat in New Mexico was completed (Neville et al. 2005). The coverage comprises >2 million acres and includes most of the remaining occupied habitat for the LPCH in portions of Chaves, Roosevelt, Lea, and Eddy counties. Habitat analysis has identified >200,000 acres of potential LPCH habitat restoration areas;
- Protective BLM management of suitable and occupied LPCH habitat, including a large LPCH CMA (~245,000 acres) maintained by the Roswell District where no oil and gas leases have been issued since 1997;
- In recognition of the potential impacts of resource extraction on LPCH populations, local and seasonal restrictions on oil and gas developments have been placed on public lands administered by the BLM to protect LPCH;
- The BLM has initiated a broad-scale reclamation project (~20,000 acres) in LPCH habitat in Eddy, Lea, Chaves, and Roosevelt counties, where LPCH populations are considered sparse and scattered, that will increase the extent of suitable habitat in the southern portion of the species range;
- Recent landscape scale analysis has identified 17 areas (113,053 acres) with habitat characteristics favorable for LPCH on public lands administered by the Carlsbad BLM. These areas are considered crucial for the future recovery of LPCH in the Carlsbad region and may serve as locations for habitat restoration and eventual species reintroduction efforts;
- Acquisition of 18,500 acres of prime LPCH habitat by TNC in Roosevelt County;
- Continued education and public outreach efforts through venues such as the annual High Plains Prairie-Chicken Festival in Milnesand, New Mexico;
- A 5-state LPCH Conservation Initiative is underway in CO, KS, NM, OK, and TX through the Western Association of Fish and Wildlife Agencies that will provide added benefit to this species in, and surrounding, New Mexico.

These actions represent a significant step toward the management of the LPCH in New Mexico, address critical questions, and contribute to the net conservation of the species.

The total occupied range of LPCH in New Mexico is approximately 2,200 square miles and supports a statewide breeding population of about 9,600 birds. Although there is no objective definition of what constitutes a “viable” population, numerous studies indicate that a population of 5,000-50,000 is desirable for long-term persistence (Frankham et al. 2002). Based on all currently available information, the LPCH is unlikely to be threatened with extirpation or become endangered within the foreseeable future in a significant portion of its core range in New Mexico. In addition, the net benefits of ongoing conservation efforts by the state, federal agencies, and private interest groups, combined with the increase in abundance and distribution of populations in east-central New Mexico, exceed the population declines in the southern periphery of the occupied range. Thus, it is the finding of this investigation that the current status of LPCH in New Mexico does not warrant a listing under the WCA. The overall magnitude of threats to the LPCH throughout its range in New Mexico are moderate and rest primarily on the quality of existing habitat. At present, New Mexico is committing significant resources

via personnel, outreach, and habitat improvement incentives to landowners to conserve habitat in currently occupied range and adjacent lands to safeguard the species. LPCH numbers are stable in the core of remaining LPCH populations in New Mexico; measurable increases in population response often come years after habitat improvements are implemented. Therefore, the species status, in the face of existing threats to LPCH habitats, and barring unforeseen drought and development, is improving and will continue to improve in future years.

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**APPENDICES**

Appendix I. Survey for Active Lesser Prairie-Chicken Leks: Spring 2005.

Appendix II. Operational Plan Accomplishments: FY2002-2005.

Appendix III. Peer reviews of the Draft Investigation Report and responses

**Appendix II. Operational Plan Accomplishments: FY 2002-2005.**

**Operational Plan Accomplishments: FY2002**

(Based on Version 1 of the  
*Operational Plan*  
*for the Management of Lesser Prairie-chickens in New Mexico 2003-2006*  
written by Michael Massey)

Compiled by Dawn Davis  
January 21, 2003

1.1-1.3 The Department is currently coordinating with EDAC to develop and classify a GIS coverage of habitat and land cover of eastern New Mexico at a resolution that matches the spatial scale used by LPC and which will compare vegetation cover estimates from the Landsat analysis to field measurements with distribution of LPC. We will classify the central part of their range first and will focus on 16 quads (Bledsoe, Bledsoe SW, Crossroads, Milnesand SW, Flying M Ranch, Bledsoe NE, Bluitt, Milnesand, Milnesand NW, Button Mesa NE, Button Mesa N, Lingo, Garrison, Pep, Dora SW, Elida SE, and Schram Lake) during this fiscal year. These quads include the Gallinas Wells, Marshall, Milnesand, Black Hills, Crossroads 1 and 2, South Bluitt, and North Bluitt PCAs. Classification of northeastern New Mexico lands will be initiated in subsequent years. The BLM has completed classifying habitat on Roswell FO lands. Classification of Carlsbad FO lands is to begin this year.

2.1-2.3 Research into legal access for all PCAs is being conducted by CSD (Jeff Pederson, Wildlife Lands Specialist). Nine PCAs have been identified which have legal access.

2.4 Landowners were contacted and permission was granted to inventory LPC leks on private lands adjoining 3 PCAs: Black Hills, North Bluit, and Claudell during Spring 2002.

2.5 Dawn Davis assigned personnel to survey specific PCAs.

2.6 Dawn Davis trained contractors and Department personnel on LPC survey protocol in March 2002.

2.7 Surveys were conducted on 26 of the 29 PCAs from April 1-19, 2002.

2.8-2.9 Results from the 2002 survey for active LPC leks were summarized in the Federal Aid Report W-104-R-42, prepared by Dawn Davis.

2.10 Dawn Davis has attended meetings with the El Llano Estacado RC&D, and both Curry and Roosevelt County Soil & Water Conservation Districts. Tentative agreements have been made with 2 private landowners in Curry County, 1 in Roosevelt County, and 1 in Chaves County to survey for LPC on private ranches in Spring 2003. Efforts to contact private landowners will continue so more private lands are available to be surveyed next year.

2.11-2.16 In 2001, a letter was sent to all Natural Resources Conservation Service (NRCS) offices in eastern New Mexico requesting that landowners report any known or possible LPC localities to NMDGF or the local NRCS office. No reports of LPC were received outside of Roosevelt or Lea counties. A private individual was contracted under the USFWS to conduct surveys on private lands. Surveys were conducted on 4 private ranches in Roosevelt County in March-April 2002, to assess the presence or absence of LPC excluded from coverage via roadside surveys. Forty leks were detected containing 483 birds. State Game Commission Regulation 19 NMAC 33.4 requires locations of LPC found on private lands be kept strictly confidential. Results from the 2002 private lands survey are summarized in the Federal Aid Report W-104-R-42, prepared by Dawn Davis.

2.17 Dawn Davis prepared maps and instructions for roadside LPC surveys.

2.18 Personnel was assigned to specific roadside routes by Dawn Davis.

2.19 See Task 2.6.

2.20 Twenty-nine roadside routes were surveyed from April 1-19, 2002.

2.21 In 2002, 8 roadside routes were surveyed on 3 occasions from late March to late April to assess the effect of survey timing on lek detection.

2.22-2.23 Results from the 2002 survey for active LPC leks were summarized in the Federal Aid Report W-104-R-42, prepared by Dawn Davis.

2.24-2.26 The Department is currently coordinating with DISC Information Services to re-evaluate roadside survey routes for their value in determining LPC population distribution and abundance. A LPC Survey Evaluation Report was compiled in May 2002 by William Gould under the Federal Aid in Wildlife Restoration Grant W-104-R-38-42. Recommendations will be implemented during Spring 2003.

2.27-2.33 In 2002, 10 routes were randomly selected for roadside surveys in an area of sandy soils in the northeastern part of the LPC range. Dawn Davis assigned personnel to specific surveys. Only 5 of 10 routes selected for roadside surveys in NE New Mexico were surveyed during Spring 2002; no leks were detected. However, of the 5 routes surveyed, 2 routes were either partially or entirely on private land and were not fully accessible and 2 routes were surveyed under weather conditions (rain, wind exceeded 12 mph), which may have precluded lek detection. Current roadside efforts in the northeast will be re-evaluated during 2003 so that routes occur on public roads within suitable LPC habitat. Results from the 2002 survey for active LPC leks in the northeast were summarized in the Federal Aid Report W-104-R-42, prepared by Dawn Davis.

2.34 Under the revised Operational Plan the Department is scheduled to map the historic and current distribution of LPC in FY2004

2.35 The Department contacted the New Mexico Natural Heritage Program in October 2002 and will cooperate in maintaining the LPC database.

3.1 Under the revised Operational Plan areas of suitable but apparently unoccupied habitat will be identified in FY2004

18.1 Scheduled for implementation in FY2004.

18.2 Scheduled for implementation in FY2004.

18.3 Scheduled for implementation in FY2005.

4.1-4.2 During FY2003, the Department will identify research needs where knowledge of life history requirements of LPC is lacking and will prepare research proposals and secure funding accordingly.

4.3 Research on the effects of shrub control and grazing on habitat quality and reproductive success of LPC continued to be conducted in 2002 on North Bluit PCA and adjacent Weaver Ranch.

4.4 Monies were appropriated and the contract with G.M. Sutton Avian Research Center to study factors affecting nesting success and mortality of LPC in New Mexico is on going.

4.5 Dawn Davis assisted contractors with tracking LPC and assisted with graduate study on brood survivorship and microhabitat use.

4.6 Dawn Davis assisted contractors with vegetative, insect, and environmental data collections.

4.7 Scheduled for implementation in FY2006.

4.8 Scheduled for implementation in FY2006.

4.9 Not completed.

19.1 The Department accompanied Troy Best, CFO, and RFO on a field tour of LPC habitat in March 2002. In addition, the Department responded to requests for information on LPC lek activity on PCAs. An annual report was completed by Troy Best and John Hunt and submitted to Carlsbad BLM in September 2002.

7.1 Dawn Davis conducted literature searches for range management practices, as necessary.

7.2 Dawn Davis met with NRCS personnel to discuss protocol and guidelines for implementing management practices to improve LPC habitat.

8.1-8.5 Dawn Davis has contacted 23 private landowners (Curry Co. = 7; Roosevelt Co. = 10; Chaves Co. = 4; Lea Co. = 1; Harding Co. = 1). There are 4 landowners with active EQIP contracts in Roosevelt County and an additional 4 have applied for funds (Roosevelt Co. = 2; Chaves Co. = 2). In addition, the Department signed up 1 private landowner to compete for the LIP. The Department is also working with the USFWS on a tentative agreement with a private landowner under the Private Lands Stewardship Program.

13.1 The Department responded to the Bogle Vest Camp Shinnery Oak Control Draft EA (NMGF Doc. No. 7861) in April 2002, which addressed the potential effects of Tebuthiuron treatments on shinnery oak habitats on the sand dune lizard, and LPC.

13.2 See Tasks 8.1-8.5.

13.3 Where warranted, the Department will initiate and maintain management plans with landowners.

14.1 See Tasks 2.1-2.3

14.2 A meeting to discuss approaches to implement land use practices on PCAs that will improve habitat conditions and which may help sustain LPC was conducted in December 2002. Priority areas were identified and vegetative mapping is planned for February 2003.

14.3 Scheduled for implementation in FY2003.

14.4 See Tasks 2.1-2.3

14.5 Scheduled for implementation in FY2003.

14.6 Scheduled for implementation in FY2003.

14.7-14.11 Ninety miles of existing boundary fence lines have been inspected and repaired where necessary. A new gate was installed in the northwest corner of Crossroads 1. Property boundaries have been completed on Gallina Wells 2 and Crossroads 2. A cultural survey has been completed on the 8.5 miles of boundary around Gallina Wells 2 and Crossroads 2 as well as 31 entrances, 18 water development enclosures, and around 8 windmills on the major PCAs. The survey also included a planned administrative site on the Black Hills East PCA. Items planned for this fiscal year are fencing Gallinas Wells 2 and Crossroads 2. Property boundary surveys and cultural surveys are planned for Bledsoe and Little Dipper in preparation for fencing the next fiscal year.

14.12-14.13 Boundary signs continue to be placed on fence lines of PCAs including: Black Hills East and West, North and South Bluit, Claudell, Crossroads 1, Gallina Wells 1, 3, 4, and 5, Liberty, and Marshall. Entrance signs have been replaced on the following PCAs: North Bluit, Claudell, Gallina Wells 3 and 5, Liberty, and Marshall. New entrance signs have been purchased for placement at South Bluit, Crossroads 1, Gallina Wells 1, 4, and 6 when cultural clearance has been approved by SHPO. Another sign order is in process, which includes entrance, regulation, and boundary signs.

14.14-14.17 Repairs have been made to water units at North Bluit, Gallina Wells 1, 5, 6, Liberty, and Milnesand, repairing them to a functioning condition. The windmill at North Bluit has been repaired and is functioning.

14.18-14.19 Under the revised Operational Plan roads on PCAs will be mapped and inventoried in FY2003-04.

14.20 Under the revised Operational Plan the Department will identify oil and gas companies operating on PCAs during FY2003.

14.21 Scheduled for implementation in FY2003.

14.22 Scheduled for implementation in FY2004.

14.23 Scheduled for implementation in FY2004.

14.24 Scheduled for implementation in FY2004.

14.25-14.26 The Department is working with Dynegy Midstream Services to remedy the placement of an unauthorized pipeline on the South Bluit PCA.

14.27-14.28 Under the revised Operational Plan the Department will negotiate with oil and gas companies operating on PCAs to: eliminate roads unnecessary for oil and gas operations, remove base and reseed with native grass/forb mixes, install cattle guards at PCA entrances, and implement BLM stipulations for timing restriction activities.

14.29 Vegetative surveys were completed on the North Bluit PCA. Vegetative monitoring on 6 PCAs identified as priority areas will be initiated in Fall 2003 (Black Hills, Milnesand, Gallina 1, 2, and 3, and Crossroads 2).

14.30 Wildlife Plus provided a Draft Programmatic Report summarizing data on the effects of shrub control on LPC habitat quality to the El Llano Estacado RC&D in December 2002. In July 2002, Sutton provided the Department with a progress report on factors affecting nesting success and mortality of LPC in New Mexico.

14.31 Scheduled for implementation in FY2003.

14.32 Dawn Davis has conducted literature searches for range management practices, as

necessary.

14.33 Dawn Davis has attended the 2002 WAFWA meeting in Albuquerque and 2002 LPC Interstate Working Group and Core-Committee meeting in Lamar, CO. She is registered to attend the 36<sup>th</sup> Joint Annual TWS conference in Gallup in February 2003.

14.34 Scheduled for implementation in FY2003.

15.1 Dawn Davis has met with NRCS and USFWS personnel to identify fund sources available for habitat work on private lands.

15.2 The Department is working cooperatively with the USFWS with landowners in Roosevelt and Chaves County to facilitate partnerships to bear or share the costs of maintaining or improving LPC habitat on private lands.

15.3 Dawn Davis has regularly attended meetings with the El Llano Estacado RC&D.

15.4 Dawn Davis has reviewed grant proposals to the National Fish and Wildlife Foundation and provided comments to the USFWS on the Draft Conservation Agreement with Assurances for non-federal landowners managing to conserve the LPC.

5.1-5.3 Under the revised Operational Plan, the Department will determine what minimum LPC abundance and distribution is needed to maintain LPC population viability in FY2006.

6.1-6.3 Under the revised Operational Plan, the Department will identify population levels, which will sustain hunting and make appropriate recommendations to the State Game Commission in FY2006.

9.1 Dawn Davis attended and participated in LPC IWG and Core-Committee meetings in Lamar, CO during September 2002.

9.2 The LPC IWG is working to develop a national LPC management plan. Data collections is anticipated to be completed by March 2003 and there is a tentative plan to have a draft document completed by the 2003 IWG meeting in Kansas.

16.1 Scheduled for implementation in FY2003.

16.2 Under the revised Operational Plan, a written literature review of grouse trapping and transplanting efforts will be completed by FY2004.

16.3 Scheduled for implementation in FY2005.

16.4 Scheduled for implementation in FY2006.

17.1 Scheduled for implementation in FY2003.

17.2 Scheduled for implementation in FY2003.

17.3 Scheduled for implementation in FY2004.

17.4 Scheduled for implementation in FY2005.

20.1 Not completed.

20.2 Dawn Davis has met with representatives from the oil and gas industry, attended NMOGA meetings, and has worked cooperatively with the Little Chicken Committee Working Group to discuss ways in which the oil and gas operational activities can be conducted with little impact to LPC populations.

21.1-21.10 Dawn Davis will be meeting with the Assistant Director, DOW, and CSD staff to discuss the adequacy of current information on the status of LPC and adherence to the WCA during FY 2003. A report outlining what the Department must do to ensure compliance with WCA will be completed October 2003.

11.1 The Department will be developing a brochure directed at landowners to describe incentive programs available and land management practices that benefit LPC. In addition, the Department will be creating a link with information on LPC for the NMDGF website.

11.2 In April 2002, the Department held New Mexico's first High Plains Prairie-Chicken Festival. The Festival brought together over 70 people representing several interest groups, including private landowners, state and federal agency personnel, bird watchers, and other environmental organizations. Planning for the 2003 Festival is underway.

11.3 The Department has a tentative agreement to assist the El Llano Estacado RC&D with an agricultural workshop (Ag in the Classroom) to be scheduled at Mesa Elementary, Clovis in July 2003.

11.4 Scheduled for implementation in FY2003. The Department will assist at a booth dedicated to LPC at the Roosevelt County Ag Expo in February 2003.

11.5 The First High Plains Prairie-Chicken Festival was highlighted on the BirdingAmerica.com website and featured in the Outdoor section of the New Mexican. Articles were also featured in New Mexico Wildlife.

12.1 No habitat projects were conducted on PCA's during FY2002; volunteers will be enlisted as necessary.

12.2 The Department has contacted the Clovis Quail Unlimited chapter to volunteer with water development projects on private lands outlined in the LIP grant proposal.

10.1-10.2 The Department is coordinating with DISC Information Services to conduct a public opinion poll to measure New Mexican's knowledge of and satisfaction with management of LPC in FY2003 and FY2006.

**Operational Plan Accomplishments: FY2003**

(Based on the Revised Version of the

*Operational Plan*

*for the Management of Lesser Prairie-Chickens in New Mexico 2003-2006*

written by Dawn M. Davis, February 2003)

Compiled by Dawn M. Davis

September 19, 2003

**TASKS UNDER OBJECTIVE I. Determine the abundance and distribution of habitat believed to be suitable for supporting lesser prairie-chicken (LPC):**

1.1-1.3 The Department administered a contract to develop and classify a GIS coverage of habitat and land cover of eastern New Mexico at a resolution that matches the spatial scale used by LPC. This project was undertaken by Earth Data Analysis Center (EDAC) during Spring 2003 and will be completed in FY2004. To date, EDAC has completed field measurements at 26 vegetation plots and 20 map plots, which covered approximately 11 of the 19 quads they are creating the classification for. A preliminary map will be completed in Fall 2003, which will be used to gather supplemental plots to improve the GIS coverage. The Bureau of Land Management (BLM) has completed classifying habitat on Roswell Field Office (FO) lands. Classification of Carlsbad FO lands is to begin this year.

**TASKS UNDER OBJECTIVE II. Identify habitats which, though believed suitable, are apparently unoccupied by LPC:**

3.1 The Department is currently developing a database documenting all lek sites identified from roadside route surveys and surveys conducted on Commission-owned prairie-chicken areas (PCAs). A map of the current distribution of LPC is scheduled for implementation in FY2004 (see task 2.11).

3.2 Scheduled for implementation in FY2004.

3.3 Scheduled for implementation in FY2004.

**TASKS UNDER OBJECTIVE III. Determine the current distribution and abundance of LPC in New Mexico:**

2.1 Roadside route surveys were developed in 1997 with the assistance of Dr. David Crowley, consulting statistician now with New Mexico State University (NMSU) and input from New Mexico Department of Game and Fish (NMDGF) staff. Data from roadside routes and PCA surveys were used in the 1999 Wildlife Conservation Act (WCA) investigation, which had the approval of the LPC peer-review committee. Recently, the Department coordinated with DISC Information Services to re-evaluate roadside survey routes for their value in determining LPC population distribution and

abundance. As part of this evaluation, William Gould compiled a LPC Survey Evaluation Report under the Federal Aid in Wildlife Restoration Grant W-104-R-38-42.

2.2 Dawn Davis trained contractors and Department personnel on LPC survey protocol in March 2003.

2.2 Landowners were contacted and permission was granted to inventory LPC leks on private lands adjoining 5 PCAs: Milnesand and Gallina Wells 2-5 during Spring 2003.

2.4-2.5 In 2001, a letter was sent to all Natural Resources Conservation Service (NRCS) offices in eastern New Mexico requesting that landowners report any known or possible LPC localities to NMDGF or the local NRCS office. No reports of LPC were received outside of Roosevelt or Lea counties. Since the Spring of 2001, a U.S. Fish and Wildlife Service (USFWS) contractor, trained in NMDGF survey methods, conducted all surveys on private lands in Roosevelt, Lea, Chaves, DeBaca, Harding, and Curry counties. Forty-two landowners have been contacted and approximately 78,000 ha (192,000 ac) of private lands were surveyed during Spring 2001-2003 to assess the presence of LPC excluded from coverage via roadside surveys. In 2003, 89 leks containing 697 birds were detected on private lands in Curry and Roosevelt counties. State Game Commission Regulation 19 NMAC 33.4 requires locations of LPC found on private lands be kept strictly confidential. Results from the 2003 private lands survey are summarized in the Federal Aid Report W-138-R-1, prepared by Dawn Davis.

2.6 Surveys were conducted on 26 of the 29 PCAs from March 29-April 17, 2003.

2.7 Twenty-nine roadside routes were surveyed from April 1-19, 2003.

2.8 In 2003, 10 roadside routes were surveyed on 3 occasions from late March to late April to assess the effect of survey timing on lek detection. This was the third year replicate surveys on roadside routes were conducted. The number of LPC and leks observed peaked in early April during all 3 years. Peak activity in eastern New Mexico during the first 2 weeks in April is apparent when data from all 3 years are combined.

2.9 In 2002, 10 routes were randomly selected for roadside surveys in an area of sandy soils in the northeastern part of the LPC range. Seven of the 10 routes were either partially or entirely on private lands and were not fully accessible; therefore, routes were precluded from the survey. In 2003, roadside routes were re-evaluated and included 3 routes from 2002 and 7 randomly selected routes previously surveyed by NMDGF in 1999 and in areas near reported sightings of LPC. No leks were detected on these routes. Results from the 2003 survey for active LPC leks in the northeast were summarized in the Federal Aid Report W-138-R-1, prepared by Dawn Davis.

2.10 Results from the 2003 survey for active LPC leks were summarized in the Federal Aid Report W-138-R-1, prepared by Dawn Davis.

2.11 Scheduled for implementation in FY2004.

2.12 The Department provided lek location data (excluding leks detected on private lands) from the 2003 PCA surveys to the New Mexico Natural Heritage Program in July 2003 and will continue to cooperate in maintaining the LPC database.

**TASKS UNDER OBJECTIVE IV. Identify probable factors preventing occupation of suitable habitats by LPC:**

4.1-4.2 The Department identified research needs and prepared research proposals to secure funding as necessary. Currently, the Department is preparing a proposal, which will evaluate genetic variation among LPC leks in eastern New Mexico.

4.3 Research on the effects of shrub control and grazing on habitat quality and reproductive success of LPC continued to be conducted in 2003 on North Bluit PCA and adjacent Weaver Ranch. A report was prepared by Sutton Avian Research Center and was included in Federal Aid Report W-138-R-1. In 2003, Dawn Davis assisted contractors with trapping LPC and helped out with vegetative and environmental data collection.

**TASKS UNDER OBJECTIVE V. Evaluate the potential for inbreeding in small isolated populations to impede population growth:**

18.1 Scheduled for implementation in FY2004.

18.2 Scheduled for implementation in FY2004. A potential contractor, Dr. Ronald Van Den Bussche, Oklahoma State University, has been identified to test and analyze DNA for heterogeneity.

18.4 Scheduled for implementation in FY2004-2006.

**TASKS UNDER OBJECTIVE VI. Determine the impacts of oil and gas industry operations on LPC populations:**

19.2 The Department responded to requests for information on LPC lek activity on PCAs, which will be incorporated into an annual report from Auburn University.

19.3 Scheduled for implementation in FY2004.

**TASKS UNDER OBJECTIVE VII. Continue to work with federal agencies to implement land use guidelines that will support the LPC populations need to meet recreation and ecological expectations:**

7.1 Dawn Davis met with USFWS, BLM and NRCS personnel to discuss protocol and guidelines for implementing management practices to improve LPC habitat and conducted literature searches for range management practices, as necessary. In addition,

Department personnel have participated in the Southeast New Mexico Lesser Prairie-Chicken Working Group.

**TASKS UNDER OBJECTIVE VIII. Continue to work with public land managers and private landowners to implement projects that will maintain or improve the quality and extent of LPC habitat:**

8.1 In 2003, Dawn Davis contacted 43 private landowners (Curry Co. = 3; Roosevelt Co. = 31; Chaves Co. = 8; Lea Co. = 1). Six of these landowners applied for 2003 Environmental Quality Incentives Program (EQIP) funds (Roosevelt Co. = 2; Chaves Co. = 4); 3 landowners received 2003 EQIP Funds for habitat improvement projects in Chaves County. In addition, 17 private landowners applied for Grasslands Reserve Program (GRP) funds (Roosevelt Co. = 15; Chaves Co. = 2).

8.2 Habitat and range conditions were evaluated on private lands in Chaves County in response to a request by a private landowner.

8.3 Department personnel met with private landowners regarding LPC habitat management conservation strategies and issues. Dawn Davis assisted 5 landowners with preparation of grant proposals for the Department's Wildlife Partnership Fund. Six grant proposals were submitted and 2 cooperative agreements were established between private landowners and the Department to participate in constructing structures that enhance and improve wildlife habitat for grassland species, including LPC.

8.4 Not completed.

**TASKS UNDER OBJECTIVE IX. Continue to work with public agencies and private landowners:**

13.1 The Department responded to environmental documents from public land management agencies, as necessary. In March 2003, the Department supported efforts proposed by the Roswell FO, BLM to control mammalian predators in a portion of LPC habitat in the southern portion of the Caprock Wildlife Habitat Area.

13.2 See Tasks 8.1-8.4.

13.3 Where warranted, the Department will initiate and maintain management plans with landowners.

**TASKS UNDER OBJECTIVE X. Implement land use practices on Commission-owned PCAs that will improve habitat conditions and may help sustain local populations of LPC:**

14.2 Research into legal access for all PCAs is being conducted by the Conservation Services

Division (CSD). Nine PCAs have been identified which have legal access: Milnesand, Black Hills, Gallina Wells 2, Crossroads 2, Wayside, Little Dipper, Bledsoe, and Claudell.

14.3 A meeting to discuss approaches to implement land use practices on PCAs that will improve habitat conditions and which may help sustain LPC was conducted in December 2002. Priority areas were identified and protocols and guidelines for vegetative monitoring will be developed in Fall 2003, if time permits.

14.4 Surveys and property boundaries have been identified and marked on Bledsoe and Little Dipper PCAs.

14.4 Archeological and cultural surveys were completed for Bledsoe and Little Dipper PCAs in preparation for fencing.

14.5 Boundary fence inspections were completed and repairs made, as necessary, on the following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Gallina Wells, Liberty, Marshall, and Milnesand. Fences and cattle guards were installed on Gallina Wells 2. Items planned for this fiscal year include fencing Crossroads 2.

14.6 Boundary signs continue to be placed on fence lines of PCAs including: Black Hills East and West, Crossroads 4, and Gallina Wells 3. Regulation signs have been placed on the following PCAs: Black Hills West, Milnesand, North Bluit, Claudell, Gallina Wells 1-6, Liberty, and Marshall. New entrance signs have been posted on Gallina Wells 1 and 2. Another sign order is in process, which includes entrance, regulation, and boundary signs.

14.7-14.8 Water units and windmills were inspected on the following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Gallina Wells, Liberty, Marshall, and Milnesand. Repairs have been made to water units at Black Hills, Marshall, and Milnesand, repairing them to a functioning condition.

14.9 PCAs will be mapped and inventoried in FY2003-2004. No tasks were completed in FY2003.

14.10 Not completed.

14.11-14.12 The Department will continue to negotiate with oil and gas companies operating on PCAs. For example, the Department is working with Dynegy Midstream Services to remedy the placement of an unauthorized pipeline on South Bluit PCA. In addition, the Department received a request from Cimmaron Exploration and Dawson Geophysical to do a seismic survey on Milnesand PCA. To date the exploration company has not completed a cultural survey to receive SHPO clearance. The Department also worked with BLM Petroleum Enforcement to ensure a muffler installed on a pump jack on North Bluit PCA met compliance of <75 dB at 30 ft from the exhaust.

14.13-14.14 Vegetative surveys were completed on the North Bluit PCA. Once a vegetative monitoring protocol is developed, and if time permits, monitoring on 6 PCAs identified as priority areas (Black Hills, Milnesand, Gallina Wells 1-3, and Crossroads 2) will be initiated in Fall 2003. Once initial monitoring has been accomplished, meetings will be held to discuss methods of vegetative manipulation.

**TASKS UNDER OBJECTIVE XI. Facilitate the development of partnerships to bear or share the cost of maintaining or improving LPC habitat on private lands:**

15.5 Dawn Davis has met with NRCS and USFWS personnel to identify fund sources available for habitat work on private lands.

15.6 The Department is working cooperatively with the USFWS, NRCS, and private landowners in eastern New Mexico to facilitate partnerships to bear or share the costs of maintaining or improving LPC habitat on private lands.

**TASKS UNDER OBJECTIVE XII. Establish baseline targets for population abundance and distribution:**

5.1-5.2 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIII. Maintain the current regulatory closure of LPC hunting seasons until data indicate populations are sufficient to sustain hunting:**

6.1 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIV. Continue to participate with the LPC Interstate Working Group (IWG):**

9.1 Dawn Davis provided the IWG with information to assist with the development of a national LPC management plan; a draft document is anticipated to be completed by the 2003 IWG meeting in Kansas.

**TASKS UNDER OBJECTIVE XV. Evaluate trapping and transplanting of wild birds as a technique to re-establish LPC populations to viable levels:**

16.1 Scheduled for implementation in FY2004.

**TASKS UNDER OBJECTIVE XVI. Consider the feasibility of using captive-reared birds to supplement or re-establish viable, self-sustaining wild populations:**

17.1 Scheduled for implementation in FY2004.

**TASKS UNDER OBJECTIVE XVII. Work with involved private, public, and corporate interests to develop and employ economical feasible practices that minimize the adverse impacts of their operations on LPC populations:**

20.1 Dawn Davis has met with representatives from the oil and gas industry, attended NMOGA meetings, and has worked cooperatively with the Little Chicken Committee Working Group to discuss ways in which the oil and gas operational activities can be conducted with little impact to LPC populations.

**TASKS UNDER OBJECTIVE XVIII. Assess findings from our investigation regarding the abundance, distribution, habitat needs, and limiting factors for LPC populations:**

21.1 Dawn Davis met with Director Larry Bell, Assistant Director Tod Stevenson, Wildlife Management Division (formerly DOW), and CSD staff to discuss the adequacy of current information on the status of LPC and adherence to the WCA in April 2003.

21.2 Scheduled for implementation in FY2004.

21.3 Where warranted, documents pertaining to the WCA LPC investigation have been submitted to the public repository file.

21.4 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIX. Develop public information and conservation education programs:**

11.3 The Department assisted the El Llano Estacado RC&D with a booth dedicated to LPC at the Roosevelt County Ag Expo in February 2003.

11.4 The Department is developing a brochure directed at landowners to describe incentive programs available through NMDGF and land management practices that benefit LPC. A draft will be printed in FY2004.

11.5 The Second Annual High Plains Prairie-Chicken Festival was featured in newspaper articles in the Clovis News Journal and Portales News Tribune. LPC articles were also featured in New Mexico Wildlife, the Share With Wildlife newsletter, Playa Post, and the Wildlife Edition of Southwest Extra.

11.6 Scheduled for implementation in FY2004.

11.7 In April 2003, the Department held New Mexico's Second Annual High Plains Prairie-Chicken Festival. The Festival brought together over 125 people representing several interest groups, including private landowners, state and federal agency personnel, bird watchers, and other environmental organizations. Planning for the 2004 Festival is underway.

11.8 Department personnel attended the 36<sup>th</sup> Joint Annual TWS Conference in Gallup in February 2003.

**TASKS UNDER OBJECTIVE XX. Involve volunteers in management projects and selected research projects.**

12.1 No habitat projects were conducted on PCAs during 2003; volunteers will be enlisted as necessary.

**TASK UNDER OBJECTIVE XXI. Measure public satisfaction at beginning of and end of life of plan:**

10.1 The Department coordinated with DISC Information Services to conduct a public opinion poll to measure New Mexican's knowledge of and satisfaction with management of LPC in FY2003. Preliminary survey results indicate nearly 13,000 New Mexico residents were mailed the survey. Over 1,600 responded for an overall response rate of about 12%. Results are currently being tabulated and analyzed by DISC Information Services.

**Operational Plan Accomplishments: FY2004**

(Based on the Revised Version of the  
*Operational Plan for the Management of Lesser Prairie-Chickens in New Mexico 2003-2006*

written by Dawn M. Davis, February 2003)

Compiled by Dawn M. Davis

August 25, 2004

**TASKS UNDER OBJECTIVE I. Determine the abundance and distribution of habitat believed to be suitable for supporting lesser prairie-chicken (LPC):**

1.1-1.3 The Department administered a contract to develop and classify a GIS coverage of habitat and land cover of eastern New Mexico at a resolution of 2 m pixels. The classification will cover 16 7.5' quads south and east of Portales. This project was undertaken by Earth Data Analysis Center (EDAC) during Spring 2003 and will be completed in FY2005. To date, EDAC has completed a preliminary map and is completing field verification. The map has proved to be more accurate and precise than the GAP coverage. Results will be presented at the 8<sup>th</sup> annual meeting of the LPC Interstate Working Group in Carlsbad, November 16-18, 2004. In addition, EDAC is completing classification and field verification of remote-sensed habitat maps for the Carlsbad BLM lands and 6 7.5' topo quads adjacent to the southern boundary of the map being prepared for the Department. Including these new maps with the habitat map that was completed for Roswell BLM lands will result in more than half of New Mexico's LPC habitat mapped by the end of FY2005.

**TASKS UNDER OBJECTIVE II. Identify habitats which, though believed suitable, are apparently unoccupied by LPC:**

3.1 The Department has developed a database documenting all lek sites identified from roadside route surveys and surveys conducted on Commission-owned prairie-chicken areas (PCAs) and are working cooperatively with the SLO to map the current distribution of LPC.

3.2 Not completed.

3.3 Not completed.

**TASKS UNDER OBJECTIVE III. Determine the current distribution and abundance of LPC in New Mexico:**

2.1 Roadside route surveys were developed in 1997 with the assistance of Dr. David Cowley, consulting statistician now with New Mexico State University (NMSU) and input from New Mexico Department of Game and Fish (NMDGF) staff. Recently, the Department coordinated with DISC Information Services to re-evaluate roadside survey routes for their value in determining LPC population distribution and abundance. As part

of this evaluation, William Gould compiled a LPC Survey Evaluation Report under the Federal Aid in Wildlife Restoration Grant W-104-R-38-42.

2.2 Dawn Davis trained contractors and Department personnel on LPC survey protocol in March 2004.

2.3 No inventories were conducted on private lands in which leks were detected from PCAs in 2004.

2.4-2.5 In 2004, landowners that had expressed interest at the Southeastern New Mexico Lesser Prairie-Chicken Working Group were contacted for their willingness to allow Department personnel to survey for LPC on their private lands. Approximately 1,035 ha (2,560 ac) of private lands were surveyed in southern Lea County. No formal routes were established. Instead listening points were established in areas of suitable habitat and where the landowner had reported sighting LPC. Results from the 2004 private lands survey are summarized in the Federal Aid Report W-138-R-2, prepared by Dawn Davis.

2.6 Surveys were conducted on 27 of the 29 PCAs from March 28-April 21, 2004.

2.7 Seventy-three roadside routes were surveyed from April 1-20, 2004; of these 41 were newly established, mostly in the southern part of New Mexico's LPC range.

2.8 Task was completed in FY2003.

2.9 In 2003, roadside routes were established in the northeastern part of the LPC historical range, east and south of Clayton, NM and east and south of Amistad, NM (which were previously surveyed by NMDGF in 1999) and areas near reported sightings of LPC. No leks were detected on these routes. Results from the 2004 survey for active LPC leks in the northeast were summarized in the Federal Aid Report W-138-R-2, prepared by Dawn Davis.

2.10 Results from the 2004 survey for active LPC leks were summarized in the Federal Aid Report W-138-R-2, prepared by Dawn Davis.

2.11 See Task 3.1.

2.12 The New Mexico Natural Heritage Program has maintained a database of all LPC population survey data since the mid-1990's. As the lead management entity for LPC, NMDGF plans to work with the Heritage Program on management of the database.

**TASKS UNDER OBJECTIVE IV. Identify probable factors preventing occupation of suitable habitats by LPC:**

4.1-4.3 The Department identified research needs and prepared research proposals to secure funding as necessary. The Department designed and initiated investigations in Spring 2004 which will evaluate genetic variation among LPC leks in eastern New

Mexico and which will describe breeding season habitat use by LPC that occupy a predominately shinnery oak vegetative community in east-central New Mexico.

4.3 Research on the effects of shrub control and grazing on habitat quality and reproductive success of LPC continued to be conducted in 2004 on North Bluit PCA and adjacent Weaver Ranch. A report was prepared by Sutton Avian Research Center and was included in Federal Aid Performance Report W-138-R-2.

**TASKS UNDER OBJECTIVE V. Evaluate the potential for inbreeding in small isolated populations to impede population growth:**

18.1 Blood samples were collected from 16 LPC within the core of the occupied range in east-central New Mexico. Samples will be used to describe the molecular variance of LPC populations in eastern New Mexico.

18.2 A contractor, Dr. Ronald Van Den Bussche, Oklahoma State University, has been identified to test and analyze DNA for heterogeneity.

18.5 Scheduled for implementation in FY2004-2006.

**TASKS UNDER OBJECTIVE VI. Determine the impacts of oil and gas industry operations on LPC populations:**

19.1-19.2 The Department has requested a copy of the final report authored by John Hunt, Auburn University from the Carlsbad BLM. The Department also has been working with the Southeast Working Group to create management approaches that minimize the effect of oil and gas (O&G) development on LPC. Finally, the Department was instrumental in development of a conservation strategy for active leks on state lands that might be leased for O&G development.

**TASKS UNDER OBJECTIVE VII. Continue to work with federal agencies to implement land use guidelines that will support the LPC populations need to meet recreation and ecological expectations:**

7.2 Dawn Davis met with USFWS, BLM and NRCS personnel to discuss protocol and guidelines for implementing management practices to improve LPC habitat and conducted literature searches for range management practices, as necessary. In addition, Department personnel have participated in the Southeast New Mexico Lesser Prairie-Chicken Working Group.

**TASKS UNDER OBJECTIVE VIII. Continue to work with public land managers and private landowners to implement projects that will maintain or improve the quality and extent of LPC habitat:**

8.1 In 2004, Dawn Davis contacted 18 private landowners (Curry Co. = 1; Roosevelt Co. = 8; Chaves Co. = 4; DeBaca Co. = 1; Quay Co. = 1, Harding Co. = 3). Two of these

landowners were awarded Grassland Reserve Program (GRP) funds. One landowner in Chaves County has entered into a contract with the USFWS Partners for Fish and Wildlife Program and NMDGF has developed a cooperative agreement through the Department's Wildlife Partnership Fund between 1 private landowner in Roosevelt County to participate in constructing structures that enhance and improve wildlife habitat for grassland species (including LPC). In addition to these programs, Grasslands Charitable Foundation was awarded \$153,300 for grassland habitat management and playa lake conservation under the Private Stewardship Grant Program. Working in cooperation with 7 landowners, approximately 16,000 acres of short- and midgrass prairie and playa lake habitat will be enhanced or restored. The Department was also awarded a \$1.3 million Landowner Incentive Program grant. A coordinator has been hired and landowners will be recruited for habitat conservation projects during FY2005.

8.4 Habitat and range conditions were evaluated on private lands in Chaves County in response to a request by a private landowner.

8.5 Department personnel met with private landowners regarding LPC habitat management conservation strategies and issues. Dawn Davis assisted 3 landowners with preparation of grant proposals for the Department's Wildlife Partnership Fund and 1 cooperative agreement was established between a private landowner in Roosevelt County and the Department to participate in constructing structures that enhance and improve wildlife habitat for grassland species, including LPC.

8.4 The Department maintains a database of landowners who have been solicited by NMDGF personnel to participate in land incentive programs and identifies which landowners have initiated projects for LPC conservation.

**TASKS UNDER OBJECTIVE IX. Continue to work with public agencies and private landowners:**

13.1 The Department responded to environmental documents from public land management agencies, as necessary.

13.2 See Tasks 8.1-8.4.

13.3 Where warranted, the Department will initiate and maintain management plans with landowners.

**TASKS UNDER OBJECTIVE X. Implement land use practices on Commission-owned PCAs that will improve habitat conditions and may help sustain local populations of LPC:**

14.5 Research into legal access for all PCAs is being conducted by the Conservation Services Division (CSD). Eleven PCAs have been identified which have legal access: Milnesand, Black Hills, Gallina Wells 2, Gallina Wells 4, Gallina Wells 5, Crossroads 1, Crossroads 2, Wayside, Little Dipper, Bledsoe, and Claudell.

14.6 A motion to acquire two parcels of land in Roosevelt County to assist with the Department's LPC conservation efforts will be brought before the Commission in FY2005.

14.3 Surveys and property boundaries have been identified and marked on South Bluit, Bledsoe, and Little Dipper PCAs.

14.4 Archeological and cultural surveys were completed for South Bluit, Bledsoe, and Little Dipper PCAs in preparation for fencing.

14.5 Boundary fence inspections were completed and repairs made, as necessary, on the following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Crossroads 2, Crossroads 3, Crossroads 4, Gallina Wells 1-6, Liberty, Marshall, and Milnesand. Fences were installed on Crossroads 2. Items planned for this fiscal year include fencing South Bluit, Bledsoe, and Little Dipper.

14.6 Boundary signs continue to be placed on fence lines of PCAs, as necessary

14.7-14.8 Water units and/or windmills were inspected on the following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Gallina Wells, Liberty, Marshall, and Milnesand.

14.9 Roads will be inventoried on the PCAs starting next fiscal year, beginning with Milnesand PCA.

14.10 A GIS layer that identifies O&G leases was obtained from Energy, Minerals, and Natural Resources. No further analysis has been performed.

14.11-14.13 The Department will continue to negotiate with O&G companies operating on PCAs. For example, the Department is working with Dynegy Midstream Services to remedy the placement of an unauthorized pipeline on the South Bluit PCA. Dynegy Midstream Services paid for a cultural resource survey and prepared necessary NEPA documents to re-build the boundary fence for this PCA. It is anticipated that Dynegy will complete fence construction and re-vegetation work next fiscal year. In addition, the Department received a request from Dawson Geophysical to do vibroseis on Crossroads 3 and 4. After discussions regarding seasonal restrictions and protection of lek sites, Dawson Geophysical agreed to treat the PCAs as exclusion zones and to buffer known lek sites outside the PCAs. However, the proposed vibroseis project was never implemented on surrounding lands. Oil spills have been identified in Gallina Wells 3 and 5. The Department has been corresponding with Energy, Minerals, and Natural Resources regarding these issues.

14.13-14.15 Vegetative surveys were completed on the North Bluit PCA. Once a vegetative monitoring protocol is developed, monitoring on 6 PCAs identified as priority areas (Black Hills, Milnesand, Gallina Wells 1-3, and Crossroads 2) will be initiated in

Fall 2004. Plans to optimize vegetative composition, structure and vigor for LPC will be created based on the data collected from the monitoring efforts.

**TASKS UNDER OBJECTIVE XI. Facilitate the development of partnerships to bear or share the cost of maintaining or improving LPC habitat on private lands:**

15.7 Dawn Davis has met with NRCS and USFWS personnel to identify funding sources available for habitat work on private lands.

15.8 The Department is working cooperatively with the USFWS, NRCS, and private landowners in eastern New Mexico to facilitate partnerships to bear or share the costs of maintaining or improving LPC habitat on private lands.

**TASKS UNDER OBJECTIVE XII. Establish baseline targets for population abundance and distribution:**

5.1-5.3 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIII. Maintain the current regulatory closure of LPC hunting seasons until data indicate populations are sufficient to sustain hunting:**

6.1 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIV. Continue to participate with the LPC Interstate Working Group (IWG):**

9.1 Dawn Davis attended the annual meeting of the LPCIWG in Garden City, KS, December 10-11, 2003 and was elected Chair of the Core Committee. Planning is currently underway for the 8<sup>th</sup> annual meeting, which will be hosted by NMDGF in Carlsbad, NM, November 16-18, 2004

**TASKS UNDER OBJECTIVE XV. Evaluate trapping and transplanting of wild birds as a technique to re-establish LPC populations to viable levels:**

16.1 Not completed

**TASKS UNDER OBJECTIVE XVI. Consider the feasibility of using captive-reared birds to supplement or re-establish viable, self-sustaining wild populations:**

17.1 The Department has worked closely with the Department of Energy (WIPP) in developing a captive propagation program. Doug Lynn, WIPP land manager, visited the Attwater Prairie-chicken facility and consulted with experts in propagation of gallinaceous birds. A proposal for captive propagation of lesser prairie-chickens was presented to Congressman Pearce on August 13, 2004.

**TASKS UNDER OBJECTIVE XVII. Work with involved private, public, and corporate interests to develop and employ economical feasible practices that minimize the adverse impacts of their operations on LPC populations:**

20.1 Dawn Davis met with representatives from the oil and gas industry, attended NMOGA meetings, and has worked cooperatively with the Little Chicken Committee Working Group to discuss ways in which the oil and gas operational activities can be conducted with little impact to LPC populations. Through the Southeast Working Group, the Department participated in development of management recommendations to reduce the impacts of grazing and oil and gas development.

**TASKS UNDER OBJECTIVE XVIII. Assess findings from our investigation regarding the abundance, distribution, habitat needs, and limiting factors for LPC populations:**

21.1-21.2 The current administration believes that Director Maracchini's withdrawal of his recommendation for listing at the November 1999 State Game Commission meeting was done within the full compliance of the WCA. The administration also believes the Department currently is in compliance with the Wildlife Conservation Act and listing LPC would not enhance current recovery efforts.

21.3 Where warranted, documents pertaining to the WCA LPC investigation have been submitted to the public repository file.

21.4 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIX. Develop public information and conservation education programs:**

11.9 The Department assisted the El Llano Estacado RC&D with a booth dedicated to LPC at the Roosevelt County Ag Expo in February 2004. Dawn Davis presented information programs to the Dora and Clovis school districts.

11.10 The Department is developing a brochure directed at landowners to describe incentive programs available through NMDGF and land management practices that benefit LPC. The brochure will be printed in FY2005.

11.3 LPC articles were featured in the Albuquerque Journal, Santa Fe New Mexican, Portales News Tribune, the New Mexico Wildlife Federation Outdoor Report newsletter, New Mexico Wildlifer, the Share With Wildlife newsletter, and Playa Post.

11.4 An outline of contents for the Department website link for LPC has been reviewed and will be online by Fall 2004.

11.5 In April 2004, the Department held New Mexico's Third Annual High Plains

Prairie-Chicken Festival. The Festival brought together over 100 people representing several interest groups, including private landowners, state and federal agency personnel, bird watchers, and other environmental organizations. Maximum numbers of participants have attended all 3 years of the Festival.

11.6 Department personnel attended the 25<sup>th</sup> Prairie Grouse Technical Council Meeting in Siren, WI, September 29-October 3, 2003.

**TASKS UNDER OBJECTIVE XX. Involve volunteers in management projects and selected research projects:**

12.1 No habitat projects were conducted on PCAs during 2004; volunteers will be enlisted as necessary.

**TASK UNDER OBJECTIVE XXI. Measure public satisfaction at beginning of and end of life of plan:**

10.1 The Department coordinated with DISC Information Services to conduct a public opinion poll to measure New Mexican's knowledge of and satisfaction with management of LPC in FY03. Preliminary survey results indicate nearly 13,000 New Mexico residents were mailed the survey. Over 1,600 responded for an overall response rate of about 12%. A copy of the report is attached.

**Operational Plan Accomplishments: FY2005**

(Based on the Revised Version of the  
*Operational Plan for the Management of Lesser Prairie-Chickens in New Mexico 2003-2006*

written by Dawn M. Davis, February 2003)

Compiled by Dawn M. Davis  
August 12, 2005

**TASKS UNDER OBJECTIVE I. Determine the abundance and distribution of habitat believed to be suitable for supporting lesser prairie-chicken (LPC):**

1.1-1.3 The Department administered a contract to develop and classify a GIS coverage of habitat and land cover of eastern New Mexico at a resolution of 2 m pixels. This project was undertaken by Earth Data Analysis Center (EDAC) during Spring 2003 to present. To date, EDAC has completed a preliminary map and conducted site visits in July and August of 2004 in the 56 quad region in southeastern New Mexico that comprises the LPC habitat study. The map has proved to be more accurate and precise than the GAP coverage and was used by the Southeast Working Group stakeholders and oil and gas (O&G) industry representatives to resolve management issues for the LPC. Presently, the final report is being completed and it, along with the other developed data sets, are expected to be delivered in FY06.

**TASKS UNDER OBJECTIVE II. Identify habitats which, though believed suitable, are apparently unoccupied by LPC:**

3.1-3.3 The Department has developed a database documenting all lek sites identified from roadside route surveys and surveys conducted on Commission-owned prairie-chicken areas (PCAs) and are working cooperatively with the State Land Office (SLO) to map the current distribution of LPC. In addition, EDAC, in cooperation with the Department and the Southeast Working Group has developed a detailed habitat map. EDAC is also completing classification and field verification of remote-sensed habitat maps for public lands administered by Carlsbad Bureau of Land Management (BLM). Including these new maps with the habitat map that was completed for Roswell BLM has resulted in more than half of New Mexico's LPC habitat mapped by the end of FY2005.

**TASKS UNDER OBJECTIVE III. Determine the current distribution and abundance of LPC in New Mexico:**

2.1 Roadside route surveys were developed in 1997 with the assistance of Dr. David Cowley, consulting statistician now with New Mexico State University (NMSU) and input from New Mexico Department of Game and Fish (NMDGF) staff. Recently, the Department coordinated with DISC Information Services to re-evaluate roadside survey routes for their value in determining LPC population distribution and abundance. As part of this evaluation, William Gould compiled a LPC Survey Evaluation Report under the Federal Aid in Wildlife Restoration Grant W-104-R-38-42.

2.2 Dawn Davis trained contractors and Department personnel on LPC survey protocol in March 2005.

2.3 No inventories were conducted on private lands in which leks were detected from PCAs in 2005.

2.4-2.5 In 2005, a U.S. Fish and Wildlife Service (USFWS) contractor, trained in NMDGF survey methods, conducted surveys on private lands in Roosevelt and Curry counties. No formal routes were established. Instead listening points were established in areas of suitable habitat and where the landowner had reported sighting LPC. Any information collected from private lands is strictly confidential and subject to the State Game Commission Regulation 19 NMAC 33.4.

2.6 Surveys were conducted on 26 of the 29 PCAs from March 25-April 15, 2005.

2.7 Thirty-nine roadside routes were surveyed from April 1-14, 2005; including 10 routes in the northeastern part of the LPC historical range and 29 routes in east-central New Mexico.

2.8 Task was completed in FY2003.

2.9 In 2003, roadside routes were established in the northeastern part of the LPC historical range, east and south of Clayton, NM and east and south of Amistad, NM (which were previously surveyed by NMDGF in 1999) and areas near reported sightings of LPC. No leks were detected on these routes. Results from the 2005 survey for active LPC leks in the northeast were summarized in the Federal Aid Report W-138-R-3, prepared by Dawn Davis.

2.10 Results from the 2005 survey for active LPC leks were summarized in the Federal Aid Report W-138-R-3, prepared by Dawn Davis.

2.11 See Task 3.1.

2.13 The New Mexico Natural Heritage Program has maintained a database of all LPC population survey data since the mid-1990's. In 2005, the Heritage Program and EDAC received funding from the Department's State Wildlife Grant to maintain and annually update the LPC database, produce data products for conservation and management planning for LPC, perform GIS analyses and produce maps as necessary, and annually revise habitat maps for LPC. As the lead management agency for LPC, NMDGF plans to continue working with the Heritage Program on management of the database.

**TASKS UNDER OBJECTIVE IV. Identify probable factors preventing occupation of suitable habitats by LPC:**

4.1-4.4 The Department identified research needs and prepared research proposals to

secure funding as necessary. The Department designed and initiated investigations in Spring 2004 which will evaluate genetic variation among LPC leks in eastern New Mexico and which will describe breeding season habitat use by LPC that occupy a predominately shinnery oak vegetative community in east-central New Mexico.

4.3 Research on the effects of shrub control and grazing on habitat quality and reproductive success of LPC continued to be conducted in 2005 on North Bluit PCA and adjacent Weaver Ranch. A report was prepared by Sutton Avian Research Center and was included in Federal Aid Performance Report W-138-R-3.

**TASKS UNDER OBJECTIVE V. Evaluate the potential for inbreeding in small isolated populations to impede population growth:**

18.1 Blood samples were collected from 38 LPC within the core of the occupied range in east-central New Mexico and scattered populations in northern Curry County during Spring 2004-2005. Samples will be used to describe the molecular variance of LPC populations in eastern New Mexico.

18.2 A contractor, Dr. Ronald Van Den Bussche, Oklahoma State University, has been identified to test and analyze DNA for heterogeneity.

18.6 Scheduled for implementation in FY2004-2006.

**TASKS UNDER OBJECTIVE VI. Determine the impacts of oil and gas industry operations on LPC populations:**

19.1-19.2 The Department has received a copy of the final report authored by John Hunt, Auburn University from the Carlsbad BLM. The Department has also been working with the Southeast Working Group to create management approaches that minimize the effect of O&G development on LPC. The Department was also instrumental in development of a conservation strategy for active leks on State Trust lands that might be leased for O&G development.

**TASKS UNDER OBJECTIVE VII. Continue to work with federal agencies to implement land use guidelines that will support the LPC populations need to meet recreation and ecological expectations:**

7.3 Dawn Davis met with USFWS, BLM, and Natural Resource Conservation Service (NRCS) personnel to discuss protocol and guidelines for implementing management practices to improve LPC habitat and conducted literature searches for range management practices, as necessary. In addition, Department personnel have participated in the Southeast New Mexico Lesser Prairie-Chicken Working Group.

**TASKS UNDER OBJECTIVE VIII. Continue to work with public land managers and private landowners to implement projects that will maintain or improve the quality and extent of LPC habitat:**

8.1 In 2004, the Department was awarded a \$1.3 million Landowner Incentive Program grant. A coordinator has been hired and 3 landowners were awarded grants for habitat conservation projects in Roosevelt, Curry, and Quay counties and the Ute Creek Soil and Water Conservation District in northeast New Mexico.

8.6 Habitat and range conditions were evaluated on private lands in Chaves County in response to a request by a private landowner.

8.7 Department personnel met with private landowners regarding LPC habitat management conservation strategies and issues.

8.4 The Department maintains a database of landowners who have been solicited by NMDGF personnel to participate in land incentive programs and identifies which landowners have initiated projects for LPC conservation.

**TASKS UNDER OBJECTIVE IX. Continue to work with public agencies and private landowners:**

13.1 The Department responded to environmental documents from public land management agencies, as necessary.

13.2 See Tasks 8.1-8.4.

13.3 Where warranted, the Department will initiate and maintain management plans with landowners.

**TASKS UNDER OBJECTIVE X. Implement land use practices on Commission-owned PCAs that will improve habitat conditions and may help sustain local populations of LPC:**

14.7 Research into legal access for all PCAs is being conducted by the Conservation Services Division (CSD). Fifteen PCAs have been identified which have legal access: Milnesand, Black Hills, Gallina Wells 2, Gallina Wells 4, Gallina Wells 5, Crossroads 1, Crossroads 2, Wayside, Little Dipper, Liberty, Marshall, North Bluit, Bledsoe, Farmers, and Claudell.

14.8 A motion to acquire two parcels of land in Roosevelt County to assist with the Department's LPC conservation efforts were brought before the Directorate in FY2005.

14.3 Completed in FY2005.

14.4 Completed in FY2005.

14.7 Boundary fence inspections were completed and repairs made, as necessary, on the

following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Crossroads 2, Gallina Wells 1-6, Liberty, Marshall, and Milnesand. Fences were installed on South Bluit and the north mile of Bledsoe. The south ½ mile of Bledsoe will be fenced pending approval of a water pipeline easement. Fences will be installed at Farmers and Little Dipper in FY2006.

14.8 Boundary signs continue to be placed on fence lines of PCAs, as necessary

14.7-14.8 Water units and/or windmills were inspected on the following PCAs: Black Hills, North Bluit, South Bluit, Claudell, Crossroads 1, Gallina Wells 1, 3, 4, 5, 6, Liberty, Marshall, and Milnesand. A new water development at Gallina Wells 2 and new water tanks for Gallina Wells 4 & 5 are proposed for FY2007.

14.9 Road and structure GIS inventories were completed on Claudell, Crossroads 1 & 2 Gallina Wells 2-6, Liberty, Marshall, Milnesand, North Bluit, and South Bluit.

14.10 A GIS layer that identifies O&G leases was obtained from Energy, Minerals, and Natural Resources. No further analysis has been performed.

14.11-14.14 The Department will continue to negotiate with O&G companies operating on PCAs. For example, the Department received a request from Cimarron Exploration Company to conduct a site inspection for a proposed well site on Milnesand PCA. The proposed action would require the construction and maintenance of a well pad and an access road originating from a previous surface disturbance. Under the proposed action, approximately 1,200 feet of new road would be constructed to access the proposed well site; however, the original location staked for the access road originated at an active lek site. Cimarron proposed approaching the well site through Milnesand PCA from the southwest entrance. This route not only transverses suitable LPC habitat but passes numerous active lek sites. Because the frequency of travel to the well head could potentially impact the suitability of the area by direct disturbance to booming grounds and fragmentation of nesting and brood-rearing habitat, the Department requested the company consider options for relocating the proposed access route. Such an alternative would reduce the “footprint” of roads on the PCA and avoid impacts on existing habitats and LPC populations. However, after discussions the proposed project was never implemented.

Oil spills have been identified in Gallina Wells 3 and 5. The Department has been corresponding with Energy, Minerals, and Natural Resources regarding these issues.

14.13-14.16 A vegetative monitoring protocol was developed and 6 PCAs were identified as priority areas (Black Hills, Milnesand, Gallina Wells 1-3, and Crossroads 2). Vegetative surveys were completed on Milnesand PCA during Fall F004. Plans to optimize vegetative composition, structure and vigor for LPC will be created based on the data collected from the monitoring efforts.

**TASKS UNDER OBJECTIVE XI. Facilitate the development of partnerships to bear or share the cost of maintaining or improving LPC habitat on private lands.**

15.9 Dawn Davis has met with NRCS and USFWS personnel to identify funding sources available for habitat work on private lands.

15.10 The Department is working cooperatively with the USFWS, NRCS, and private landowners in eastern New Mexico to facilitate partnerships to bear or share the costs of maintaining or improving LPC habitat on private lands.

**TASKS UNDER OBJECTIVE XII. Establish baseline targets for population abundance and distribution:**

5.1-5.4 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIII. Maintain the current regulatory closure of LPC hunting seasons until data indicate populations are sufficient to sustain hunting:**

6.1 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIV. Continue to participate with the LPC Interstate Working Group (IWG):**

9.1 Dawn Davis attended the annual meeting of the LPCIWG in Carlsbad, NM, November 17-18, 2004 and was re-elected Chair of the Core Committee.

**TASKS UNDER OBJECTIVE XV. Evaluate trapping and transplanting of wild birds as a technique to re-establish LPC populations to viable levels:**

16.1 Not completed

**TASKS UNDER OBJECTIVE XVI. Consider the feasibility of using captive-reared birds to supplement or re-establish viable, self-sustaining wild populations:**

17.1 The Department has worked closely with the Department of Energy (WIPP) in developing a captive propagation program. A proposal for captive propagation of LPC was presented to Congressman Pearce in August 2004. A Candidate Conservation Agreement with Assurances for the LPC between the Center of Excellence for Hazardous Material Management and the USFWS is presently being negotiated for private landowners in Lea and Eddy counties. The purpose of the Agreement is to support ongoing efforts to establish and maintain viable populations of LPC in areas that they historically occupied.

**TASKS UNDER OBJECTIVE XVII. Work with involved private, public, and corporate interests to develop and employ economical feasible practices that minimize the adverse impacts of their operations on LPC populations:**

20.1 Dawn Davis met with representatives from the O&G industry and participated as a member of the RMPA Planning Team to develop a resource management plan amendment that maintains and protects existing habitat for LPC, and enhances habitat for LPC, while simultaneously allowing multiple use activities on lands administered by the Roswell and Carlsbad BLM. Through the Southeast Working Group, the Department participated in development of management recommendations to reduce the impacts of grazing and O&G development.

**TASKS UNDER OBJECTIVE XVIII. Assess findings from our investigation regarding the abundance, distribution, habitat needs, and limiting factors for LPC populations:**

21.1-21.2 Dawn Davis has initiated a species status review and an investigation report will be submitted to the peer review panel in Fall 2005.

21.5 Where warranted, documents pertaining to the WCA LPC investigation have been submitted to the public repository file.

21.6 Scheduled for implementation in FY2006.

**TASKS UNDER OBJECTIVE XIX. Develop public information and conservation education programs:**

11.11 The Department assisted the El Llano Estacado RC&D with a booth dedicated to LPC at the Roosevelt County Ag Expo in February 2005.

11.12 The Department, in cooperation with New Mexico Department of Agriculture and New Mexico Cooperative Extension Service, developed a brochure directed at landowners to describe incentive programs available through NMDGF and other government agencies to benefit LPC.

11.7 LPC articles were featured in the Portales News Tribune, Clovis News Journal, the Nature Conservancy, Hello New Mexico, and reports were broadcasted on Wild New Mexico.

11.8 An outline of contents for the Department website link for LPC has been reviewed and will be online by Fall 2005.

11.9 In April 2005, the Department held New Mexico's Fourth Annual High Plains Prairie-Chicken Festival. The Festival brought together over 100 people representing several interest groups, including private landowners, state and federal agency personnel,

bird watchers, and other environmental organizations. Maximum numbers of participants have attended all 4 years of the Festival.

11.6 Department personnel will attend range wildlife workshops and symposia as opportunities arise.

**TASKS UNDER OBJECTIVE XX. Involve volunteers in management projects and selected research projects:**

12.1 No habitat projects were conducted on PCAs during 2005; volunteers will be enlisted as necessary.

**TASK UNDER OBJECTIVE XXI. Measure public satisfaction at beginning of and end of life of plan:**

10.1 Completed in FY2003.

Appendix III. Peer Reviews of the Draft Investigation Report and responses.

- Dr. Jon Boren, Extension Wildlife Specialist, Cooperative Extension Service, New Mexico State University.
- Dr. David Hacker, Department of Natural Sciences, New Mexico Highlands University
- Dr. Kristine Johnson, New Mexico Natural Heritage Program, University of New Mexico.
- Dr. J. David Ligon, Professor Emeritus, Department of Biology, University of New Mexico.
- Dr. Roger Peterson, New Mexico Natural Heritage Institute, Santa Fe.
- Dr. Rebecca Reiss, Associate Professor, Department of Biology, New Mexico Tech University



COOPERATIVE EXTENSION SERVICE  
**NEW MEXICO STATE UNIVERSITY**  
BOX 3AE, LAS CRUCES, NEW MEXICO 88003-8003  
COLLEGE OF AGRICULTURE AND HOME ECONOMICS

October 11, 2005

Dawn M. Davis  
Lesser Prairie-Chicken Biologist  
New Mexico Department of Game & Fish  
1421 Hickory Street  
Clovis, NM 88101

Dear Ms. Davis,

I would like to thank you for the opportunity to review and provide comments on the Draft Investigation Report entitled "Status of the Lesser Prairie-Chicken in New Mexico and Recommendation to Not List the Species as Threatened under the New Mexico Wildlife Conservation Act". In general, the report was well organized and clearly written. The report also provided the most current information available regarding population status and research efforts pertaining to lesser prairie-chickens in New Mexico (Chapter 2 and Appendices). There is significantly more quantitative information available on the status of prairie-chickens now compared to 1999 when the New Mexico Department of Game & Fish (NMDG&F) investigated the status for listing as threatened under New Mexico's Wildlife Conservation Act. In addition, conservation and management efforts to maintain and improve lesser prairie-chicken habitat in New Mexico have significantly improved. Future analysis of potential limiting factors will facilitate future management recommendations for the lesser prairie-chicken in New Mexico.

It is my assessment that the report clearly articulated the potential threats to New Mexico lesser prairie-chickens including habitat fragmentation, livestock grazing, changing land uses, predation, hunting and poaching, disease, climate and weather, oil and gas development, wind energy development, and population isolation. I also felt the discussions were well balanced and sufficiently documented. In regard to discussions on potential threats of livestock grazing, I offer the following only as additional discussion material on the potential effects of grazing on lesser prairie-chicken habitat.

The historical decline of prairie-chickens throughout their former range in Colorado, Kansas, Oklahoma, Texas, and New Mexico was most likely due to a combination of factors including overgrazing in some areas. Because nesting occurs in late April – early May prior to growth of new vegetation, nesting cover depends on adequate residual vegetation from the previous year's growing season. As mentioned in the report, management of lesser prairie-chicken habitat involves maintenance of a mosaic of vegetative conditions. Nesting cover may be improved with light stocking rates, periodic deferment, or exclusion of grazing livestock. Proper livestock management that promotes a diversity of plants and cover types can benefit prairie-chickens. Grazing management that maintains rangeland in middle to late stages of plant succession (native tall grasses, forbs, and legumes) interspersed with early stages of plant succession (native annual forbs) is needed (Bidwell et al. 1995). Uneven grazing

patterns under season-long and year-long continuous grazing create an interspersed of short grass, bare ground and tall, lightly grazed bunches of grass providing easy travel for broods, access to seeds and insects, and close escape cover (Bidwell et al. 1995). Rotational grazing can increase plant diversity by reducing grazing selectivity. Grazed rangelands also produce more food (seeds and insects) and habitat diversity than ungrazed areas (Bidwell et al. 1995). In general, a mosaic of lightly and heavily grazed patches is most desirable. In fact, grazing by cattle on the booming ground will usually improve its attractiveness to prairie chickens (Bidwell et al. 1995).

Grazing management strategies include the use of alternative grazing systems, appropriate season of use, proper stocking rate, suitable breeds and classes of livestock, and basic range practices to ensure proper grazing distribution. Comparative studies on the influence of grazing strategies on lesser prairie-chickens need to continue. Grazing levels, systems, and management plans suitable for enhancement of lesser prairie-chicken habitat must be based on quantitative studies and should be site-specific.

The report provided sound biological data and articulated ongoing conservation efforts to support the finding that the lesser prairie-chicken is “unlikely to be threatened with extirpation or become endangered within the foreseeable future in a significant portion of its core range in New Mexico”. In addition, it must be kept in mind that lesser prairie-chickens have a high biotic potential typical of small, upland game birds. Annual population turnover and variation in abundance is usually large. Therefore, populations may increase or decrease greatly in one year, depending largely upon annual reproductive success. I also strongly agree with the report that lands enrolled in the CRP might provide an important management opportunity for increasing and improving lesser prairie-chicken habitat in New Mexico. As stated in the report, lesser prairie-chickens have expanded their range in response to multiple-species native grass CRP stands in Kansas. The report also states that “outside of the core area, lesser prairie-chickens have expanded their abundance and distribution, presumably in response to multiple-species native grass CRP stands, in northern Curry County where populations are considered sparse and scattered”. These observations emphasize the concept that strategies involving incentives or compensation can be beneficial and are more desirable than those relying on penalties and restrictions.

I am a proponent for an aggressive educational program coupled with the continued monitoring of the statewide population of the lesser prairie-chicken. The educational program should include range management practices that enhance or maintain nesting habitat. Because the majority of lesser-prairie chicken habitat is located on private land (59% of the historic range is privately owned in New Mexico), cooperation between state, federal, and private entities is essential. Continuing to build partnerships coupled with incentives for private landowners offers the greatest potential for improving management of these birds in New Mexico.

The 1999 “Draft Listing Recommendation for the Lesser Prairie-Chicken in New Mexico” clearly stated the NMDG&F had not emphasized lesser prairie-chickens in recent decades and had very limited resources to increase monitoring, management of the species, or public outreach. This report makes apparent that attention and resources have been allocated to the management of lesser prairie-chickens in New Mexico. The current monitoring, habitat management and public outreach efforts are critical components for the future management and subsequent increase of lesser-prairie

chickens in New Mexico. Again, I strongly recommend continuing to use an educational approach based on partnerships between federal, state, and private entities coupled with continued collection of population data to monitor statewide trends.

I would like to thank you for the opportunity to review and provide comments on the Draft Investigation Report. I also concur with your listing recommendation to not list the species as threatened. If you have any questions or concerns, please do not hesitate contacting me.

Sincerely,

Jon Boren, Ph.D.  
Extension Wildlife Specialist  
New Mexico State University  
Box 30003, MSC-3AE  
Las Cruces, NM 88003-8003

# NMHU

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## Forestry Discipline

18 November 2005

Dawn M. Davis, Lesser Prairie-Chicken Biologist  
New Mexico Department of Game & Fish  
1421 Hickory Street  
Clovis, NM 88101

Dear Ms. Davis:

This correspondence is my critical review of the *Status of the Lesser Prairie Chicken in New Mexico*. As I understand it, the need for this investigation was driven by a petition to explore the status of the lesser prairie chicken (*Tympanuchus pallidicinctus*) for listing the bird as threatened under the Wildlife Conservation Act. This study was then undertaken to make a recommendation to list or not list the lesser prairie chicken.

The report is very thorough. It contains good discussions on the life history of the lesser prairie chicken, threats to the bird including current pressures as well as potential threats, and conservation tactics. There is a comprehensive discussion of the literature and it also includes the agency's data as well. This report is very well done and exhibits both professionalism and skill.

Given the specific conservation actions detailed on pages 26 and 27 and the thoroughness of the report, I concur with the findings of the author. There is no reason to change the status of the lesser prairie chicken at this time.

Sincerely,

David Hacker /s/

W. David Hacker, PhD  
Professor

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**Review of: Status of the lesser prairie-chicken in New Mexico and recommendation to not list the species as threatened under the New Mexico Wildlife Conservation Act**

Kris Johnson

My general impression of this document is that it needs more scientific rigor. The document is filled with unsupported assertions about lesser prairie-chicken (LPCH) biology and the status of LPCH in New Mexico. References are lacking for many assertions, those cited oftentimes provide an unbalanced view, and important references are omitted. I understand that the primary goal may not be a scholarly literature review, but if important information is left out, the document becomes heavily weighed by opinion (politics?) and therefore loses credibility. In addition, conclusions are drawn without the benefit of data. The evidence that the LPCH should not be listed may exist, but it's not presented in this document, which will need a lot of work before it's convincing. Specific comments follow.

Page numbers refer to page number of the pdf file (as displayed in Acrobat), not numbers indicated on the page of the document.

P 4, para 1. A more accurate term would be "shrubland." "Rangeland" refers to use for grazing; shrubland refers to the vegetation community, without implication for land use.

P 5, fig 1.1. What is meant by "acquired range"?

P 6, para 2. 25,000 acres of suitable habitat needed to support a viable population. This is a conclusion from one study, not a known or accepted fact. True also for home ranges given.

P 6, para 3. "If each lek *were* surrounded by a one-mile radius of suitable nesting habitat.." One mile contradicts the 1.8 mi stated in the next paragraph. One mile is not sufficient to provide for even the majority of hens that attend a lek.

P 7, para 1. It's not accurate to say that nests are typically in bluestem. In heavily grazed areas, hens nest where they can find cover. In our study on the Caprock WHMA, that often meant under an oak or yucca plant. Why not cite these reports?

P 9, para1. Our program is called Natural Heritage New Mexico (formerly New Mexico Natural Heritage Program, but never "Institute"). Johnsgard 2002 is not in lit. cit. It sounds like you're skeptical of the <1000 bird figure. If so, dispute it specifically based on Johnsgard's methods, data, or whatever.

P 9, para 2. How can roadside data provide population status, since these surveys provide no bird counts? Trends in lek number, maybe, but population status, no.

Table 2.1 Are you taking these lek numbers at face value or also looking at methods? Did they visit more sites in later years (I know number of leks visited varied greatly over the years)? Did they count single males or isolated pairs of males as leks? I'm sure a thorough analysis has not been done, because they just now got us their 2005 data and they haven't been databased.

P 10, top. We know that number of routes increased over the years, so a blanket statement that number of leks on roadside routes increased is not necessarily fair. Be specific and take all variables into account. And besides, take a look at the roadside survey table (P 54, Appendix A). How can you get from this dataset that number of leks have increased, when most tests are nowhere near significant and many trends are decreasing?

P 10, sec. 2.2. Explain how estimated harvest numbers are derived.

P 11, sec. 2.3. I don't think you have the most recent data for Carlsbad Field Office.

P 12, para. 1. Last sentence. Who/what is your source for this statement about wind power and juniper?

P 12, para. 2. Again, how are these estimates derived? Last sentence: You provide little data to support the assertion that LPCH numbers are stable or increasing, outside of the PCAs. What about other areas outside the healthiest part of the population in the core area?

You fail to cite Johnson et al. SW Naturalist paper and the recent habitat analyses by Neville et al., of the study your agency funded.

P 12, sec. 2.4. In this section you first establish that transplantation has been tried and failed repeatedly. Then you go on to say that establishing reserves "will" expand the range of the species. Not if transplantation doesn't work.

P 14, top. Again, use biological terms, not range management terms: grassland, shrubland. Rangeland only says cattle eat it, not what the dominant vegetation is.

P 14, sec. 3.2 para. 2. You imply, without providing data, that LPCH populations increased due to mixed stands of CRP species.

P 16, sec. 4.1, para 1. Why no mention of Neville et al. 2005 habitat analyses here? Not just habitat fragmentation, but importantly habitat loss, should be considered.

Para. 3. Cite Sutton's mortality statistics on your Department-funded study. Collision mortality is not that hard to measure. See Wolfe et al. 2003, and you also fail to cite numbers from their appendix in this report.

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P 17, sec. 4.2. The assertion that heavy grazing is necessary for healthy grasslands is extremely biased, and the implication that LPCH need grazing to support successful nesting is unsupported at best.

Sec. 4.3 last para. A pro-teb bias is showing here. Johnson et al. SW Nat paper? Sutton studies? Other references show impacts of herbicide on LPCH (referenced in SW Nat paper).

P 18, sec. 4.4 Again, Sutton has data for NM on predation.  
Last para. in section. Are you serious about predator control? Are you going to start killing hawks and snakes, primary predators of LPCH (according to Sutton studies)?

P 20, sec. 4.6. You should note that recreational viewing of LPCH has potential to provide income to private ranchers and thus an incentive to conserve habitat.

P 20, sec. 4.7. Again, you don't cite Smith et al. paper on coccidia and Plasmodium in NM LPCH. And how about Sutton's virus work?

P 20, 4.8. Jim Bailey did an analysis of drought in east central NM and found no evidence that drought could have impacted LPCH populations. That analysis should be included here.

P 21, sec. 4.9, sentence 5. reference? Correct term would be man-made "structures," not "infrastructures." Sentence beginning "collisions with overhead..." needs a reference. In fact, this entire paragraph is not thoroughly referenced.

P 21, last para., last sentence on page. Why be skeptical here? This study provides two types of correlational evidence. Combined with other literature on oil and gas impacts on grouse, this suggests that, at the very least, caution is warranted regarding oil and gas activities.

P 22, sec. 4.1. This section needs an edit. Doesn't read smoothly in places. Habitat fragmentation is a direct, not indirect effect.

P 23, sec. 5.1, para 1. I'll take this opportunity to "grouse" about the database task. You won't even answer my queries about your data, which makes it hard to database them! Last I heard, the name of the working group was the sand shinnery working group – check official name.

Para. 2, sentence 1. This sentence is a mouthful – needs revision.

P 25, sec. 5.1. and table 5.2. Explain how these treatments will benefit LPCH. Brush control = destruction of oak? How this is done is crucial determinant of its efficacy for LPCH.

P 26, bottom. Most PCAs were not recently acquired and they aren't private.

P 28, Table 5.4. Indicate who is funding these efforts. It's a chance to show what the Department is doing. Funding sources should be in a separate column from researchers – now you can't tell who's funding and who's the researcher. Also, this table is not up to date. It does not include our SDL mapping, LPCH map update, GIS habitat analyses, or databasing.

P 29, Ch 6, para 1. 1, 3, and 4 are still clearly threats to LPCH, which would argue for listing.

Para 2. You have presented no data outside the core population area.

P 30, last para. The bottom line for this report should be LPCH numbers, and it doesn't contain enough convincing data that the population overall has increased. All the efforts are great, but the Department must demonstrate that the efforts have made a difference.

You need to show that:

1. LPCH numbers have increased over a significant time period and most of the range
2. those increases are not just due to increased rainfall
3. those increases are due to conservation efforts

I think a careful look at all available population data will suggest that:

1. LPCH populations have increased in some areas, but overall the population has not increased substantially in all areas
2. conservation efforts have been initiated and, although further increases are expected due to these measures, it is too soon to say that conservation measures have made a difference
3. until a connection can be established between conservation measures and LPCH population health and viability, and until populations have been increasing for longer and over most of the range, there is still good reason to be concerned about this species.

Appendix C. What do numbers in parentheses mean?

Appendix II. Why mix letters and numbers to indicate appendices?

These reports should be consolidated into one showing all tasks and whether, how, and when each has been addressed. You can't expect a reviewer to wade through this!

Appendix 3. What's the point of this appendix? These data must be means? Means are meaningless, so to speak, without consideration of variation and without analyses to determine statistical significance and relationship to LPCH biology.

P 90, para. 2. "former dominance"? Show me data that grasses were formerly dominant here or anywhere shinnery occurs. Provide these "historic documents." I don't believe there are any.

P 91. BTPD don't occur in shinnery habitat or in sandy soils. Why is this here?

Again, what are these “historic documents?” There is no science that I am aware of supporting the conventional wisdom that a “mosaic” is good for LPCH, and those who claim so never define mosaic. If you follow the trail of this idea through the literature, I believe you will wind up at a dataless end. If I’m wrong, please send me the references.

P 92. “Increased grass production on treated over non-treated areas will provide enhanced security and nesting cover for lesser prairie chickens.” This study has not been completed. This is an assumption, not a scientific conclusion.

**Response to Dr. Kristine Johnson's peer-review, addressed in the order in which they appear in her letter:**

- “A more accurate term would be ‘shrubland.’ ‘Rangeland’ refers to use for grazing; shrubland refers to the vegetation community, without implication for land use.”

Broadly defined, “rangeland” refers to any uncultivated grassland, shrubland, or forested land with a herbaceous and/or shrubby understory, particularly those areas producing forage for grazing by domestic and wild animals (Vallentine and Sims 1980). Under this definition, rangeland includes lands with native vegetation, but also includes lands revegetated with native plant species and subsequently managed as native range (Vallentine 1989).

Vallentine, J. F. and P. L. Sims. 1980. Range science – a guide to information resources. Gale Res. Co., Detroit, Michigan. 231 p.

Vallentine, J. F. 1989. Range development and improvements. Academic Press Inc., San Diego, California. 524 p.

- “What is meant by ‘acquired range’?”

The best effort to produce maps of North American grouse species was by Aldrich and Duvall in 1955. Their maps included both current and historical ranges. Distribution descriptions for LPCH included recovery locations for museum specimens and published reports, which added a substantial amount of validity to their accounts. Early records suggest that there may have been small LPCH populations in northeast Colorado and northwest Nebraska (Taylor and Guthery 1980, Johnsgard 2002) and there is circumstantial evidence (M. Schroeder, WDFW, personal communications) that the LPCH expanded its range northward and eastward from their original range during the 1800s (i.e., acquired range). Until a thorough examination of museum specimens are conducted and the historic distribution of habitat in the region are examined in relation to the habitat requirements and use by LPCH, Figure 1.1 should be considered an estimate (particularly with regard to original and acquired areas) of the current and extirpated distribution of the lesser prairie-chicken.

Aldrich, J. W., and A. J. Duvall. 1955. Distribution of American gallinaceous game birds. United States Fish and Wildlife Service, Circular 34, Washington D.C.

Taylor, M. A and F. S. Guthery. 1980a. Status, ecology, and management of the lesser prairie chicken. USDA Forest Service General Technical Report RM-77, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Johnsgard, P. A. 2002. Grassland grouse and their conservation. Smithsonian

Institution Press, Washington D. C.

- “25,000 acres of suitable habitat needed to support a viable population. This is a conclusion from one study, not a known or accepted fact. True also for home ranges given.”

The Final Report has been amended to address minimum patch size required to support LPCH.

- “‘If each lek *were* surrounded by a one-mile radius of suitable nesting habitat.’ One mile contradicts the 1.8 mi stated in the next paragraph. One mile is not sufficient to provide for even the majority of hens that attend a lek.”

The Final Report has been amended to provide this information.

- “It’s not accurate to say that nests are typically in bluestem. In heavily grazed areas, hens nest where they can find cover. In our study on the Caprock WHMA, that often meant under an oak or yucca plant. Why not cite these reports?”

The importance of herbaceous cover for nesting as a key component influencing nest fate of LPCH is well documented. The Draft Investigation Report states, “In shinnery oak-grasslands successful nests are typically in bluestem clumps, although shinnery oak is always present.” In their description of vegetation at LPCH nest sites, authors of the Caprock WHMA study did not draw comparisons between vegetative structure for successful and unsuccessful nests. Of the 14 nests found during the Caprock WHMA study only 3 were successful, suggesting habitat quality may have been inadequate to provide sufficient herbaceous cover for successful nesting. Lack of adequate nesting habitat is a potential limiting factor for LPCH throughout their range, thus it is important to distinguish between successful and unsuccessful nests to ascertain habitat use by nesting LPCH, particularly when making management recommendations. The vegetative characteristics described by the Caprock WHMA study are consistent with LPCH response to heavy grazing pressure and is indicative of poor LPCH nesting habitat.

- “It sounds like you’re skeptical of the <1000 bird figure. If so, dispute it specifically based on Johnsgard’s methods, data, or whatever.”

In his population assessment, Johnsgard extrapolated results from leks surveys conducted by NMDGF to compute a statewide population estimate. Lek surveys are useful to detect annual and long-term population trends or presence of LPCH in local areas (Autenrieth et al. 1982) and to track population distribution (Applegate 2000), but are less reliable in determining population size. Therefore, *ad hoc* population estimates should be interpreted with caution.

Applegate, R. D. 2000. Use and misuse of prairie-chicken lek surveys. Wildlife

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Society Bulletin 28:457-463.

Autenrieth, R., W. Molini, and C. Braun. 1982. Sage grouse management practices. Western States Sage Grouse Committee Technical Bulletin 1. Idaho Department of Fish and Game, Twin Falls, ID, USA.

- “How can roadside data provide population status, since these surveys provide no bird counts? Trends in lek number, maybe, but population status, no.”

The number of leks detected, and where possible, the total number of LPCH present at the lek, are recorded for all Department roadside route surveys. While there has been considerable annual variation in the total number of leks detected and number of LPCH observed along the 29 roadside routes, fluctuations between years might be associated with variation in survey effort (e.g., observer consistency), changes in detection probability, and changes in lek attendance rates rather than variation in population size. While failure to detect the presence of all lek locations may affect the precision of roadside route surveys, training of observers by NMDGF prior to data collection and standardization of lek count protocols has improved the reliability and efficiency of roadside route surveys. Thus, the Department believes annual counts of both the number of active leks within a given area and number of birds counted provides a reliable index to assess status and monitor trends of LPCH populations in east-central New Mexico.

- “Are you taking these lek numbers at face value or also looking at methods? Did they visit more sites in later years (I know number of leks visited varied greatly over the years)? Did they count single males or isolated pairs of males as leks? I’m sure a thorough analysis has not been done, because they just now got us their 2005 data and they haven’t been databased.”

The Roswell Field Office visits known and historic lek sites to determine activity and birds present. However, variation among years and in the number of leks visited and observed has occurred. Consequently, the number of active leks found each year may be a biased measure of trend due to variation in observer effort. The Final Report has been amended to include a more detailed discussion on lek survey methodologies and the consistency and rigor of surveys conducted by the BLM.

- “We know that number of routes increased over the years, so a blanket statement that number of leks on roadside routes increased is not necessarily fair. Be specific and take all variables into account. And besides, take a look at the roadside survey table (P 54, Appendix A). How can you get from this dataset that number of leks have increased, when most tests are nowhere near significant and many trends are decreasing?”

The Draft Investigation Report states, “The total number of leks detected [on roadside route surveys] has been stable...with no notable increases or decreases.” In 2005, 29 roadside routes were surveyed from April 1-14. Of these, 16 routes have been surveyed since 1998. Numbers of leks detected have fluctuated, ranging from a low of 23 in 1998 to a high of 42 in 2004 on these 16 routes, with no apparent trend. Twenty-six routes have been surveyed from 1999 to 2005. Total number of leks detected (range = 33-48 leks) has been stable over this time period with no notable increases or decreases over the last 7 years. Although 14 of 29 (48%) routes appeared to be stable or slightly increasing, no trend was detected in the number of leks identified for the 29 routes considered collectively ( $\bar{x}_\beta = 0.07$  leks/yr  $\pm 0.29$  (SD);  $t_{0.5, (2), 23} = 1.26$ ;  $P = 0.22$ ;  $P (-0.04 \leq \mu_1 - \mu_2 \leq 0.20) = 0.95$ ).

- “Explain how estimated harvest numbers are derived.”

The Final Report has been amended to provide this information.

- “I don’t think you have the most recent data for Carlsbad Field Office.”

The current status and distribution of LPCH populations reported for the Carlsbad Field Office were based on intensive spring lek surveys on the Carlsbad BLM Resource area, which were conducted in the periphery of LPCH historic range in southeast New Mexico (i.e., LPCH habitat south of Highway 380). Leks detected in northern Lea County by the CFO in 2003 are considered part of the core of remaining LPCH populations in New Mexico, which lie in south Roosevelt, north Lea, and northeast Chaves counties.

- “Who/what is your source for this statement about wind power and juniper?”

Both wind energy development and juniper encroachment have been documented through field observations by Department personnel within the range of occupied LPCH habitat in northern Curry County. Presently, little is known on how wind power developments and woody invasion affect LPCH and/or LPCH habitats. However, studies indicate grassland birds are sensitive to small increases (1-2%) in the amount of tree cover within landscapes and woody vegetation had a deleterious effect on prairie grouse occurrence, density, and/or nesting success (see Section 4.3). Research in Oklahoma and other states have shown as few as 1 tree per acre may preclude prairie obligate species from using otherwise suitable grasslands (T. S. Bidwell, Oklahoma State University, personal communication). While it is reasonable to assume other factors (e.g., rangeland conversion and fragmentation) may be involved in population declines, it is likely that woody invasion and wind power developments have impacted or will likely impact LPCH populations in northern Curry County.

- “Again, how are these estimates derived? Last sentence: You provide little data to support the assertion that LPCH numbers are stable or increasing, outside of the PCAs. What about other areas outside the healthiest part of the population in the core area?”

Population estimates from Department surveys are discussed in the referenced report (Appendix I). Presently, 4 types of surveys for active leks in eastern New Mexico have been conducted through cooperative efforts between NMDGF, USFWS, and BLM. These include roadside route surveys, surveys on PCAs, private land surveys, and surveys within the respective jurisdictions of the Roswell and Carlsbad BLM. Department surveys are located within the known occupied and potential range of LPCH in east-central New Mexico. Although roadside routes are limited in their applicability for assessing LPCH populations, current survey methods conducted by the Department are useful to detect long-term population trends and to track population distribution. Although counts of both leks and number of birds provide a reliable index to assess status and monitor trends of LPCH populations, there is a clear need to standardize data collection and reporting methods across the range to derive a reliable population assessment. While regression analysis is useful to assess population trends, the number of roadside routes necessary to detect changes in LPCH population sizes and to increase the efficiency of current LPCH survey efforts is logistically and economically not feasible. Survey methods incorporating multiple techniques may facilitate the collection of accurate population estimates and maximize precision (i.e., repeatability). Although mark-resight techniques have the greatest utility for estimating population size, the amount of effort and economic resources required to generate population estimates using this techniques limits its feasibility. Thus, despite the limitations of roadside route surveys, conclusions are based upon the best available data and current efforts to assess LPCH population trends and distribution will continue.

- “In this section you first establish that transplantation has been tried and failed repeatedly. Then you go on to say that establishing reserves “will” expand the range of the species. Not if transplantation doesn’t work.”

The Draft Investigation Report states, “If successful, captive propagation and/or transplanting might increase the effectiveness of other conservation and recovery efforts...” The Final Report has been revised and clarifying language has been added to indicate establishing reserves and reintroducing LPCH populations in southeastern New Mexico may expand the occupied range of the species.

- “You imply, without providing data, that LPCH populations increased due to mixed stands of CRP species.”

Although little information on the response of prairie grouse to CRP has been published, Kansas Department of Wildlife and Parks attributed a strong population response in LPCH and substantial range expansion to multiple-species

native grass CRP stands in west-central Kansas (Rodgers 2005, Rodgers and Hoffman 2005). Field observations by the USFWS and NMDGF personnel have also documented an increase in the range of LPCH occupying CRP grasslands in northern Curry County.

Rodgers, R. D. 2005. Conservation reserve program successes, failures, and management needs for open-land birds. Pp. 123-134 *in* A. W. Allen and M. W. Vandever, eds. *The Conservation Reserve Program – Planting for the Future: Proceedings of a National Conference*, Fort Collins, Colorado, June 6-9, 2004. USGS, Biological Resources Division, Scientific Investigation Report 2005-5145. 248 pp.

Rodgers, R. D., and R. W. Hoffman. 2005. Prairie grouse population response to conservation reserve grasslands: an overview. Pp 120-128 *in* A. W. Allen and M. W. Vandever, eds. *The Conservation Reserve Program – Planting for the Future: Proceedings of a National Conference*, Fort Collins, Colorado, June 6-9, 2004. USGS, Biological Resources Division, Scientific Investigation Report 2005-5145. 248 pp.

- “Cite Sutton’s mortality statistics on your Department-funded study. Collision mortality is not that hard to measure. See Wolfe et al. 2003, and you also fail to cite numbers from their appendix in this report.”

The Final Report has been amended to include this information.

- “The assertion that heavy grazing is necessary for healthy grasslands is extremely biased, and the implication that LPCH need grazing to support successful nesting is unsupported at best. “

As mentioned in the Draft Investigation Report, management of LPCH habitat involves maintenance of a mosaic of vegetative conditions. Nesting cover may be improved with light stocking rates, periodic deferment, or exclusion of grazing livestock. Proper livestock is necessary to maintain a landscape that can benefit LPCH (Bidwell et al. 2003). Grazing management that maintains rangeland in early (native annual forbs) and middle to late stages of plant succession (native tall grasses, forbs, and legumes) is optimal for LPCH (Bidwell et al. 2003). Uneven grazing patterns under season-long and year-long continuous grazing create a mosaic of short grass, bare ground, and tall, lightly grazed bunches of grass providing easy travel for broods, access to seeds and insects, and close escape cover (Bidwell et al. 2003).

Bidwell, T. G., S. Fuhlendorf, B. Gillen, S. Harmon, R. Horton, R. Manes, R. Rodgers, S. Sherrod, and D. Wolfe. 2003. *Ecology and management of the lesser prairie-chicken in Oklahoma*. Oklahoma State University Extension Circular E-970, Oklahoma Cooperative Extension Unit, Stillwater, Oklahoma, USA.

- “A pro-teb bias is showing here. Johnson et al. SW Nat paper? Sutton studies? Other references show impacts of herbicide on LPCH (referenced in SW Nat paper).”

The literature on the effects of brush control on LPCH is difficult to interpret because: 1) there have been few experimental studies with pre-treatment or control data; 2) relationships of LPCH abundance to differences in shrub densities have been reported for studies in which a limited range of shrub densities were observed, or no range was reported; and 3) interactions between the effects of shrub control and the effects of grazing have confounded results. Other confounding variables likely include LPCH responses to the different shrub species treated, responses to different herbicide application levels, soil types, and post-treatment precipitation. Some studies demonstrate that LPCH select untreated sites over treated (Martin 1990, Haukos and Smith 1989, Johnson et al. 2004); whereas other studies (Olawsky and Smith 1991) suggest little or no preference between treated and untreated areas. Giesen (1998) states that “[l]imited reduction in densities of shinnery oak and sand sagebrush after herbicide applications did not reduce populations of LPCH in New Mexico, Texas, Oklahoma if adequate cover and foods remained (Donaldson 1969, Olawsky and Smith 1991).”

As stated in the Draft Listing Recommendation, it is known that shinnery oak is an important habitat component for LPCH, providing both food and cover. The Draft Listing Recommendation further recognizes that application of herbicides, such as Tebuthiuron, may have variable effects on LPCH habitat depending on the manner and extent of the treatment and that past widespread application has resulted in extensive loss of LPCH habitat.

Donaldson, D. D. 1969. Effect on lesser prairie chickens of brush control in western Oklahoma. Dissertation. Oklahoma State University, Stillwater.

Haukos, D. A., and L. M. Smith. 1989. Lesser prairie chicken nest site selection and vegetation characteristics in tebuthiuron-treated and untreated sand shinnery oak in Texas. *Great Basin Naturalist* 49:624-626.

Johnson, K., B. H. Smith, G. Sadoti, T. B. Neville, and P. Neville. 2004. Habitat use and nest site selection by nesting lesser prairie-chickens in southeast New Mexico. *Southwestern Naturalist* 49:334-343.

Martin, B. H. 1990. Avian and vegetation research in the shinnery oak ecosystem of southeastern New Mexico. Thesis. New Mexico State University, Las Cruces. 116 p.

Olawsky, C. D., and L. M. Smith. 1991. Lesser prairie chicken densities on tebuthiuron-treated and untreated sand shinnery oak rangelands. *Journal*

of Range Management 44:364-368.

- “Again, Sutton has data for NM on predation. Last para. in section. Are you serious about predator control? Are you going to start killing hawks and snakes, primary predators of LPCH (according to Sutton studies)?”

The Department recognizes predator control aimed at benefiting LPCH is neither desirable nor practical. If the decline in LPCH numbers is to be reversed it must happen through better range management that favors healthy, balanced grasslands and minimized predator opportunity. It is generally agreed that the best predator defense LPCH have is quality vegetative cover in which nests and broods can be successfully concealed. Despite these drawbacks and concerns, predator control may be beneficial in some circumstances. Predator control programs may provide temporary help where habitat is recovering or where seasonal habitats have been greatly reduced. Use of predator control should be carefully considered as a strategy for protecting isolated leks and populations, where maximizing annual recruitment is vital to maintaining population viability. Control efforts can only be considered successful if reduction in all the primary predators reduces total mortality on LPCH eggs, chicks, and nesting hens. This strategy should initially be pursued on an experimental basis, with careful monitoring to assess ecological outcomes and benefits to the breeding population.

- “You should note that recreational viewing of LPCH has potential to provide income to private ranchers and thus an incentive to conserve habitat.”

Chapter 4 details the potential threats to LPCH and factors that may impact LPCH populations. While it is true that recreational viewing has the potential to: 1) provide income to private landowners through ecotourism; and 2) motivate conservation-oriented landowners to act to benefit the habitats LPCH occupy, information relating to social and economic impacts will not be considered under the listing recommendation pursuant to Section 17-2-41 Subsection G under the WCA.

- “Again, you don’t cite Smith et al. paper on coccidia and Plasmodium in NM LPCH. And how about Sutton’s virus work?”

The Final Report has been amended to include this information.

- “Jim Bailey did an analysis of drought in east central NM and found no evidence that drought could have impacted LPCH populations. That analysis should be included here.”

The observed correlation between drought and LPCH abundance is weak, in part because of the considerable variation in the LPCH data from the BLM Caprock Wildlife Area. Sampling effort varied greatly among years and leks were not selected at random which limits the ability to make statistical conclusions. Until

more reliable population data is correlated to precipitation, no inferences can be made on the influence of climate on the LPCH throughout its occupied range in New Mexico.

- “Correct term would be man-made “structures,” not “infrastructures.” Sentence beginning “collisions with overhead...” needs a reference. In fact, this entire paragraph is not thoroughly referenced.”

References have been added to the text in the Final Report.

- “Why be skeptical here? This study provides two types of correlational evidence. Combined with other literature on oil and gas impacts on grouse, this suggests that, at the very least, caution is warranted regarding oil and gas activities.”

Correlations must be carefully analyzed before inferences are drawn from them. Correlation measures the intensity of an association observed between two variables and tests whether the correlation is greater than would be expected by chance alone. The association observed between the pattern of lek abandonment and sensitivity to noise (or other forms of disturbance) from oil and gas development may provide a preliminary description of causal relationships but if an experimental method has not been applied it is not appropriate to infer causation.

- “Most PCAs were not recently acquired and they aren’t private.”

The Final Report has been revised to include this information.

- “1, 3, and 4 are still clearly threats to LPCH, which would argue for listing.”

1. the present or threatened destruction, modification or curtailment of its habitat:

In eastern New Mexico, estimates of change in rangeland acreage between 1997 and 2002 for counties within LPCH range showed no significant change in landuse. Short-term fluctuations in habitat availability and corresponding fluctuations in population size will not necessarily jeopardize LPCH populations or species persistence within the range of occupied habitat in eastern New Mexico (Aplet and Keeton 1999). In addition, the Department believes the net benefits of ongoing conservation efforts by the state, federal agencies, and private interest groups, combined with the increase in abundance and distribution of populations in east-central New Mexico, offsets some of the potential and existing impacts of changing landuse practices to LPCH habitats.

Aplet, G. H., and W. S. Keeton. 1999. Application of historical range of variability concepts to biodiversity conservation. In Practical approaches to the conservation of biological diversity (R. K. Baydack, H. Campa, and

J. B. Haufler, eds). Island Press, Washington, D.C.

3. the effect of disease or predation:

Little information is available on ectoparasites or infectious diseases in LPCH, however disease has not been shown to regulate North American grouse populations (Herman 1963). Although several endoparasites are known to infect LPCH they have not been found to limit LPCH populations.

4. other natural or man-made factors affecting its prospects of survival or recruitment within the state:

At present, New Mexico is committing significant resources via personnel, outreach, and habitat improvement incentives to landowners to conserve habitat in currently occupied range and adjacent lands to safeguard the species. LPCH numbers are stable in the core of remaining LPCH populations in New Mexico; measurable increases in population response often come years after habitat improvements are implemented. The Department believes the species status, in the face of existing threats to LPCH habitats, and barring unforeseen drought and development, is improving and will continue to improve in future years.

Herman, C. M. 1963. Disease and infection in the Tetraonidae. *Journal of Wildlife Management* 27:850-855.

- “You have presented no data outside the core population area.”

Outside of the core area, LPCH have expanded their abundance and distribution, presumably in response to multiple-species native grass CRP stands, in northern Curry County where populations are considered sparse and scattered. Annual surveys on the Caprock Wildlife Habitat Area, administered by the Roswell BLM, indicate the number of active leks more than doubled from 1999 through 2005 and the number of birds observed per lek was up from 6.00 in 1999 to 8.73 in 2005. In the southern periphery of LPCH range, intensive spring lek surveys on the Carlsbad BLM Resource Area detected only one active lek, however, LPCH have been sighted in other areas and the existence of additional leks is suspected.

- “The bottom line for this report should be LPCH numbers, and it doesn’t contain enough convincing data that the population overall has increased. All the efforts are great, but the Department must demonstrate that the efforts have made a difference.”

Throughout New Mexico, >425 leks have been identified from 2001-2005. For the purposes of this report, a lek is defined as a traditional display site with 2 or more males that have been recorded at least 1 year out of the last 5 (LPC/SDL Working Group 2005, unpublished report). By accumulating all available lek counts and the number of leks identified since 2001, the mean lek size for active

leks can be calculated and a conservative *ad hoc* spring breeding population estimate can be derived. Analysis indicated the statewide population of LPCH in New Mexico is approximately 4,800 males or a minimum breeding population of about 9,600 birds. Although there is no objective definition of what constitutes a “viable” population, numerous studies indicate that a population of 5,000-50,000 is desirable for long-term persistence (Frankham et al. 2002). Based on all currently available information, the Department believes that the occupied range of LPCH (~2,220 square miles) will support a viable population of LPCH and the species is, therefore, unlikely to be threatened with extirpation in New Mexico.

Frankham, R, J. D. Ballou, and D. JA. Briscoe. 2002. Introduction to conservation genetics. Cambridge University Press, Cambridge.

- “Appendix C. What do numbers in parentheses mean?”

The goal of surveys conducted on State Game Commission-owned PCAs is to determine presence of LPCH leks over the entire area of each PCA, i.e., a “saturation” survey. All lek sites detected either audibly or visually on or near PCAs are recorded. In 2005, 135 leks were detected either audibly or visually on or near PCAs (38 leks were detected on PCAs; 16 on state trust lands; 9 on public lands administered by the Bureau of Land Management; and 72 on private lands, respectively). Total number of leks detected are reported and the number in parentheses identifies the subsample of leks detected on the PCA.

- These reports should be consolidated into one showing all tasks and whether, how, and when each has been addressed. You can’t expect a reviewer to wade through this!

In the 1999 listing recommendation for the LPCH in New Mexico, the recommendation stated that NMDGF had not emphasized LPCH in recent decades and had limited resources to increase the monitoring, management of the species, or public outreach. Over the course of the 6-year species status review, the Department has made significant steps toward the management of LPCH in New Mexico. Appendix II (Operational Plan Accomplishments: FY 2002-2005) demonstrates conservation efforts, on-the-ground management activities, and specific conservation actions that have contributed to the net conservation of the species.

- “Appendix 3. What’s the point of this appendix?”

Appendices III-V of the Draft Investigation Report included progress reports that provided information on field research undertaken over the course of the 6-year species status review. After consideration of the peer- review panel’s submitted comments on the Draft Report, it was determined that the field research was not undertaken as part of the investigation. Accordingly, Appendices III-V and

responses to peer-review comments directed at progress reports not authored by the researcher have been excluded from the Final Investigation Report.

**Davis, Dawn M., DGF**

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**From:** David Ligon [jdligon@unm.edu] **Sent:** Mon 10/17/2005 3:12 PM  
**To:** Davis, Dawn M., DGF  
**Cc:**  
**Subject:**  
**Attachments:**

Dear Ms. Davis,

I have read the status report on the Lesser Prairie-chicken and offer the following comments. Some of the programs that are underway are commendable, perhaps especially the efforts to work with ranchers on private lands. Other programs or suggestions are not so good. For example, if things are so dire that captive rearing and release is seriously contemplated, then the bird is far more Endangered than Threatened. And this kind of approach would be more for show than for any long-term solution to the problem.

My problem with this document is its bottom-line conclusion: that the Lesser Prairie-chicken not be listed as Threatened. It is obvious that this species is in very serious trouble and that by any definition of the word it is threatened with extinction. If the estimate of 3800 birds is correct, it is beyond threatened - it is endangered. [I have some experience with a federally endangered species, the Red-cockaded Woodpecker, which at its numerical low point, was never down to 3800 birds.]

The fact that one population of LPC has held steady for a very few years by no means indicates that all is well. It may well be that natural events, such as prolonged drought, will, at some point in the future, push the species into an 'extinction vortex.' But of course the stage for that would have been set by human disturbances to its habitat; the herbicide program is a recent example.

Keep in mind that eastern New Mexico once held populations of Sage Grouse and Sharp-tailed Grouse and they are gone for many of the very same ecological reasons that the LPC is threatened/endangered. In those cases their extirpation in NM was not a complete disaster, since they continued to exist elsewhere. In contrast, the LPC is in big trouble as a species throughout its much more limited range.

I realize that politically this is not a good time for endangered species, but if the federal Endangered Species Act continues to exist and if an environmentally conscientious federal administration comes back into power, the lesser prairie-chicken will again be a prime candidate for federal listing as endangered. There are few unlisted species of birds in the country for which a stronger case for such listing can be made.

Why not be realistic and list this bird as Threatened, as that clearly is the case. If the various programs designed to increase its chances of continued survival are put into place, and if they work, then at the appropriate time it can be de-listed and the NM Department. of Game and Fish will have made the right use of the Wildlife Conservation Act. As it now stands, it appears that the decision to conclude not to list the LPC as threatened was made on the basis of concerns that have little to do with the welfare of the birds.

To summarize, while some promising approaches and programs were considered in this report, I strongly disagree with the overall conclusion. This problems of this species deserve to be officially acknowledged and dealt with over a number of years. If recovery comes about, as it could, then de-listing would be appropriate. This would be a nationally recognized 'feather-in-the-cap' of the NM Game and Fish Department.

Sincerely,

J. David Ligon  
Professor Emeritus

**Response to Dr. David Ligon’s peer-review, addressed in the order in which they appear in his letter:**

- “...if things are so dire that captive rearing and release is seriously contemplated, then the bird is far more Endangered than Threatened.”

Successful LPCH management must address maintaining and increasing current populations, expanding those populations into adjacent areas, and re-establishing additional populations. The southeast area represents the southern periphery of LPCH in New Mexico and may only be occupied during favorable climatic periods (Snyder 1967). While it is desirable to maintain and/or re-establish LPCH in their historical range within southeast New Mexico, populations in east Eddy and south Lea counties are not considered necessary for continued viability of the species in New Mexico (Bailey 1999). However, the Department recognizes wider distribution of LPCH will reduce the risk to populations from catastrophic events or local changes in land use practices. Translocations or other methods for restoring extirpating populations might facilitate expansion of LPCH populations into their historical range outside of the core of remaining LPCH populations in New Mexico and would make maintaining genetic connectivity between separate populations possible.

Bailey, J. 1999. Status and trend of the lesser prairie-chicken in New Mexico and recommendation to list the species as threatened under the New Mexico Wildlife Conservation Act. New Mexico Department of Game and Fish, Santa Fe, NM.

Snyder, W. A. 1967. Lesser prairie chicken. Pages 121-128 *in* New Mexico Wildlife Management. New Mexico Department of Game and Fish, Santa Fe, New Mexico, USA.

- “My problem with this document is its bottom-line conclusion: that the Lesser Prairie-chicken not be listed as Threatened. It is obvious that this species is in very serious trouble and that by any definition of the word it is threatened with extinction. If the estimate of 3800 birds is correct, it is beyond threatened - it is endangered. [I have some experience with a federally endangered species, the Red-cockaded Woodpecker, which at its numerical low point, was never down to 3800 birds.] ”

Long-term viability of LPCH populations is related to population size, distribution, and the species ability to maintain genetic heterogeneity. It also relates to the ability of a population to withstand fluctuations in their population and recruitment associated with annual variation in weather, predation, disease, and habitat quality. There is no objective definition of what constitutes a “viable” population, but many studies indicate that a population of 5,000-50,000 is desirable for long-term persistence (Frankham et al. 2002).

The down-listing criteria for sage-grouse in Washington is a breeding population of only  $\geq 3,200$  birds (Stinson et al. 2004). The amount of area needed to support a breeding population of 3,200 sage-grouse depends on habitat quality and could require anywhere from 92 – 3,861 square miles of habitat (Stinson et al. 2004). In Illinois, the down-listing criteria for the greater prairie-chicken is a statewide population estimate of  $>3,000$  (Walk 2004); recovery will be achieved when the statewide population averages  $> 5,000$  birds. The land unit identified to maintain a minimum viable population of greater prairie-chickens in Illinois was 19 square miles (Walk 2004). In addition to these prairie grouse species, an estimated 5,000 birds has been established as the minimum criteria for delisting the Attwater's prairie-chicken in Texas (USFWS 1993).

The 2005 minimum LPCH breeding population estimate of 3,800 birds describes the breeding population for the area surveyed in east-central New Mexico and does not include private land surveys or lands administered by the BLM. Similar measures for public lands administered by the Roswell BLM reported a breeding population of  $\sim 800$  birds occurring in the areas surveyed within the Caprock WHA in 2005. The total occupied range of LPCH is approximately 2,200 square miles and supports a statewide breeding population of about 9,600 birds. Thus, based on all currently available information, the Department believes the LPCH is unlikely to be threatened with extirpation or become endangered within the foreseeable future in a significant portion of its core range in New Mexico and constitutes a viable population.

Frankham, R, J. D. Ballou, and D. JA. Briscoe. 2002. Introduction to conservation genetics. Cambridge University Press, Cambridge.

Stinson, D. W., W. Hays, and M. A. Schroeder. 2004. Washington state recovery plan for the greater sage-grouse. Washington Department of Game and Fish, Olympia, Washington. 109 pp.

Walk, J. W. 2004. A plan for the recovery of the greater prairie-chicken in Illinois. University of Illinois, Urbana, Illinois. Office of Resource Conservation, Illinois Department of Natural Resources, Springfield, Illinois. 72 pp.

USFWS. 1993. Attwater's prairie chicken (revised) recovery plan. Albuquerque, New Mexico.

**Davis, Dawn M., DGF**

**From:** RogPete@aol.com [RogPete@aol.com]      **Sent:** Fri 9/23/2005 1 :48 PM  
**To:** Davis, Dawn M., DGF  
**Cc:** [kjohnson@unm.edu](mailto:kjohnson@unm.edu)  
**Subject:** Investigaton Report  
**Attachments:** [comments.doc\(43KB\)](#)

Dear Dawn:

Attached is a critique of your "Draft Investigation Report on the Status of the Lesser Prairie-Chicken in New Mexico." It was a pleasure to read the Report, especially Appendix V ("Progress Report on LPCH productivity..."), which was new to me. For that pleasure, I owe you careful comments.

As you say, I am knowledgeable in this area (an ecologist who spent years working in the birds' habitat). However, you needn't take my comments seriously for at least two reasons.

1. Besides being an ecologist, I have long been a conservationist. Until recently I was wildlife chair of the state Sierra Club. And I was and am secretary of the New Mexico Natural History Institute, one of the petitioners to the Department, eight years ago, that it list the prairie-chicken as threatened. So you are asking me to criticize a document that passes adverse judgment on a petition that I wrote myself.
2. You say correctly that I agreed to serve on a departmental peer review panel. But you neglect to state that I resigned from that panel in disgust' in March 2000.

But those are your concerns, not mine. Thank you for opportunity to read your Report; do what you like with my comments. I send a copy of this letter (not of the comments) to the Director only because of its footnote, which echoes a letter to his predecessor of 13 March 2000. It's on a problem of which he should be reminded (but I expect no reply).

Sincerely,

Roger S. Peterson

'In 2000, and I presume today, the Department when it contracts research requires that "No papers will be published or presentations given without the prior approval of the Department." This became known to me when asked to review a contract between the Department and Sutton Avian Research Center.

No ethical scientist can work under such a limitation, which lets the Department or the Game Commission squelch results that they don't like. The Department and the Commission have been accused of burying or twisting results to suit their purposes, including in the present (prairie-chicken) case, so this fear is not merely theoretical. A scientist who contracts to produce only results that the contractor would like is not behaving as a scientist.

Peer review and other semblances to the scientific world are meaningless in a context that forbids free expression of scientific results. Therefore when Mr. Maracchini rejected my protest, I removed myself from the peer review panel.

cc: B. C. Thompson, Director

**Comments on Draft Investigation Report, "Status of the lesser prairie-chicken  
in New Mexico and recommendation to not list the species as threatened  
under the New Mexico Wildlife Conservation Act"**

Roger S. Peterson, ecologist, Santa Fe  
23 September 2005

The report is well organized and clearly written. I do rather object to inclusion of Appendix III, at least if its present unwarranted conclusions are in it; these studies will not become relevant to prairie-chickens until results from bird studies are tied to the vegetation studies.

Your reasoning toward a Do-Not-List recommendation is clear. Essentially it is that since 1996 there has been an increase in numbers of leks and of birds and of birds per lek, therefore the species is not under present threat of extirpation. But consider the following.

1. The Department was correct in 1999, I think, to accept that prairie-chickens deserved listing as threatened. The annual harvest had dropped to 250 by 1995 from an average in the 1000-1500 range (Fig. 2.3); populations north of I-40 had disappeared and populations in Eddy and southern Lea were almost gone.
2. Your figures showing increase are mostly subject to the vagaries of sampling. The most dramatic numbers (p. 45) are of birds in or near PCAs, but that is a vaguely defined sample; where and how hard the observers looked cannot be determined. Much more reliable are leks per route (1.5 increased to 1.9) and birds per lek, which increased from 3 to 12 then to 10 on PCAs and 6 to 12 then to 9 on Caprock Wildlife Habitat Area. That is, we have escaped 1995's dismal situation, in which we probably came close to extirpation even in the core areas.
3. These figures seem to have topped out, and anyway apply mainly to the 16% of the range called core area, where populations are still low. Elsewhere no increase is clear and populations are very low.

So I think that you are basing your recommendation on inadequate data from the most populous part of prairie-chicken range, ignoring the long-term situation and the large-area situation. The bird should be listed until the large-scale population achieves long-term norms.

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The remainder of my comments are page-by-page.

- p. 1. Historical occurrence in Texas was not limited to the Panhandle. Most of the area was to the south, adjacent to New Mexico. Probably the two Texas areas were not joined but this is unknown. (I don't know how far south the birds went in Texas. Sand shinnery occurs southward to Odessa and Monaghans but there have been no prairie-chicken records there at least for decades.)

p. 2. The map of occupied range is inaccurate. No birds are known south of the latitude of New Mexico's southern border (cf. Litton et al. 1994). The few birds that are still in Andrews to Bailey counties, adjacent to New Mexico, are now widely separated from Panhandle populations.

p. 4, Brood Habitat. It's odd to have a paragraph in which each sentence taken alone is true but the paragraph is false. No, brooding birds do not seek areas with more forbs, less grass, lower grasses, or denser shrubs than the nesting areas. It's merely that nests are concentrated in areas of dense, tall vegetation; birds must spread from the nesting areas to brood (as well as remaining in the nesting areas) because more space is needed, so necessarily the average vegetation becomes less dense. Of course brooding habitats "are often found in areas with higher intensity grazing regimes;" that follows necessarily from their avoiding such areas for nesting. It is true that "Moderate grazing or other disturbance provides a mosaic of vegetation with more abundant forbs and more bare ground than in nesting habitat" but that has not been shown to relate to the birds' needs, which are perfectly well met for the birds that remain in the nesting areas. No study has ever shown any need for or advantage from a vegetational mosaic, unless by mosaic you refer to lek sites or grain fields, yet this false idea has become embedded in the literature. ...That "Brood-rearing locations are usually associated with higher levels of insect abundance" is not a comparison of brooding with nesting sites but of where prairie-chickens live vs. where they don't live, so has nothing to do with a mosaic; of course the birds live in grass-shrublands where insects are abundant rather than other vegetation where insects are less abundant.

p.6. I think that in lines 8-9 you're referring to the Natural Heritage Program (cf. pp. 60, 68).

p. 10, Land ownership. This is somewhat confusing. The three big ownerships—private, BLM, and SLO—should be emphasized.

p. 11, Current land uses. Statewide figures seem irrelevant. The paragraph is confusing; does it refer just to non-federal acres? You discuss vegetation changes due to CRP but not (here) those due to tebuthiruron, mostly on BLM land.

p. 13 ¶ 3. Wolfe et al. 2003, Causes and patterns of mortality in lesser prairie-chickens, and other Sutton publications are relevant ([www.suttoncenter.org](http://www.suttoncenter.org)).

p. 14 ¶2. The claim that grazing is necessary to healthy grasslands is shaky enough; the claim that heavy grazing is essential strikes me as baloney. "...insufficient amount of ungrazed or lightly grazed areas are necessary." Line 12: "grass height and density."

p. 17. I don't think it's true that ORV use is largely unrestricted across prairie-chicken range; most counties, like Chaves, have severe restrictions, as does BLM in some areas. But they're not enforced.

p. 17, Disease. I think that there's more information, or at least more citations, on the Sutton website ([www.suttoncenter.org](http://www.suttoncenter.org)).

p. 19 top: SLO withdrew >100,000 unleased acres???

p. 19 Wind Energy. See comment on p. 13 ¶3.

p. 26 middle. The big paragraph has a topic sentence that specifies New Mexico; jumping to overall range in the paragraph is confusing. That 5% of the species overall range is federal is not very relevant; again, as on p. 10, I think you should say what percentage of the range in New Mexico is on BLM land. BLM may be coordinating on the actual southern periphery, but not as you've mapped that periphery on p. 2.

p. 51. Wow! what a collection of non-meaningful claims.  $0.07 \pm 29!$

p. 88 last ¶. "The virtual monoculture created by pre-treatment dominant and co-dominant oak has reverted to a landscape mosaic more similar to that reported in historic documents." In fact those historic descriptions begin with that of Gregg, 1844: "an immense sand-plain was now opening before us, being entirely barren of vegetation in some places, while others were completely covered with an extraordinarily diminutive growth which has been called shin-oak...", which contains no mention of grass in the shinnery. I asked Charles Dixon to what historic documents he referred in his November 2004 abstract that described the shinnery as a grassy mosaic. He was unable to answer (or at least refrained from answering). I don't believe that any such historical documents exist.

p. 88. Black-tailed prairie dogs won't live in dense, tall plants, either shrubs or grasses, so are irrelevant to the sand shinnery.

pp. 88-89. Discussions of need for a mosaic are ill-based; no such need has ever been shown (see comment on p. 4).

p. 89. "The increased grass production on treated over non-treated areas will provide enhanced security and nesting cover..." This claim is premature; the study has not yet shown that nesting hens will even use the treated areas. In previous studies (reviewed by Peterson and Boyd p. 29) they have generally avoided treated areas.

p. 89. Given more grass and forb seed, "more of their preferred food sources is available." The author seems not to know what prairie-chickens mainly eat. Most of their food is associated with shin-oak, both plant parts and its insects.

p. 89. "Invertebrate abundance is generally positively correlated with forb abundance." This is true in some circumstances, for instance in sand sagebrush in Kansas (Jamison et al. 2002). To my knowledge it has not been shown to be true in sand shinnery, where leafhoppers, grasshoppers, and others seem mainly associated with shrubs (but this also is unproved). Anecdotally, in New Mexico and adjacent Texas in 1996, an outbreak of a

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race of *Schistocerca alutacea* averaged 62% by number and well over 90% by biomass at eight grasshopper sampling sites, far exceeding in biomass all other insects combined; this species was strictly associated with shin-oak (Peterson 1999, N.M. Naturalist's Notes 1: 34-38).

p. 104. ¶2 & ¶4 "short- and mid-grass prairies co-dominated with shinnery oak." In fact the sand shinnery is New Mexico's only tallgrass prairie, or rather, because of the many midgrasses, "mixed prairie." Shortgrasses do not codominate with anything over a foot tall. We're stretching it when we say that 1.5-foot oak codominates with 6-foot tallgrasses, but we do say so and will continue to do so for defensible reasons.

p. 104 ¶3. The reference to Cannon and Knopf is wrong; they prove no such thing. Their study compared land-uses on several-section blocks, not plant density in the usual sense. So the New Mexico findings are not "contrary." Take a look at that terrible paper!

p. 104 ¶4. "has been replaced by predominately shinnery oak." There was no replacement; there was no increase in shin-oak, merely a decrease in grasses. I can say this even not having seen the unpublished report referred to; no one has ever shown an increase in shin-oak and I don't think that it's likely to be shown. (After fire there is short-term increase in number of oak stems, but cover greatly decreases.)

p. 110 ¶1. The first sentence emphasizes herbs as against shrubs, the last emphasizes shrubs as against herbs. They should not be made to sound compatible with a word like "Similarly." What the birds want, I take it, is hiding cover, which in different situations is provided by either herbs or shrubs; neither sentence's claim will win. The penultimate sentence of ¶2 is relevant, and perhaps wrongly claims that "herbaceous" is more important.

p. 111 ¶3. The third sentence gets it right. I have no idea why anyone would claim (Sentence 5) that grasslands would provide better breeding season habitat than the shrub-grass habitat in which nearly all of the birds now live. A few adventuresome hens near Clovis and in Kansas move into grassland and that's suddenly "better"?

Well, I wanted to go back over it all, but 117 pages is a lot and I've spent quite a while on this. If you'd like me to discuss either points that I've made or points that I've missed, please ask.

**Response to Dr. Roger Peterson's peer-review, addressed in the order in which they appear in his letter:**

- “Historical occurrence in Texas was not limited to the Panhandle. Most of the area was to the south, adjacent to New Mexico. Probably the two Texas areas were not joined but this is unknown. (I don't know how far south the birds went in Texas. Sand shinnery occurs southward to Odessa and Monaghans but there have been no prairie-chicken records there at least for decades.)”

In their review of status of the LPCH in Texas, Sullivan et al. (2000) clarify the historical distribution of LPCH in Texas. The historical range of the LPCH in Texas was estimated to extend throughout most of the sandy rangeland throughout the northeastern and southwestern (Permian Basin) regions of the Texas Panhandle, from Andrews County in the southwest to Lipscomb County in the northeast (Jackson and DeArment 1963). Early accounts documented the LPCH as far south as Concho, Callahan, and Clay counties (Jackson and DeArment 1963, Litton 1978). However, birds in these were believed to be winter migrants rather than year-round residents (Bent 1932, Jackson and DeArment 1963).

Sullivan, R. M., J. P. Hughes, and J. E. Lionberger. 2000. Review of the historical and present status of the lesser prairie-chicken (*Tympanuchus pallidicinctus*) in Texas. *Prairie Naturalist* 32: 177-188.

Jackson, A. S., and R. DeArment. 1963. The lesser prairie chicken I the Texas panhandle. *Journal of Wildlife Management* 27:733-737.

Litton, G. W. 1978. The lesser prairie chicken and its management in Texas. *Texas Parks and Wildlife Booklet N7100-025*. Austin, Texas.

Bent, A. C. 1932. Life histories of North American gallinaceous birds. U.S. National Museum Bulletin 162.

- “The map of occupied range is inaccurate. No birds are known south of the latitude of New Mexico's southern border (cf. Litton et al. 1994). The few birds that are still in Andrews to Bailey counties, adjacent to New Mexico, are now widely separated from Panhandle populations.”

Figure 1.1 presents the distribution of occupied range of LPCH in New Mexico as mapped by Snyder (1967). At present a single known lek exists in southern Lea County south of 33 degrees latitude, though LPCHs have been sited in other areas and the existence of additional leks is suspected. The known occupied range of LPCH in eastern New Mexico is presented in Figure 2.4 and is based on the best available data on LPCH lek distribution.

- Brood Habitat. It's odd to have a paragraph in which each sentence taken alone is true but the paragraph is false. No, brooding birds do not seek areas with more forbs, less grass, lower grasses, or denser shrubs than the nesting areas. It's merely that nests are concentrated in areas of dense, tall vegetation; birds must spread from the nesting areas to brood (as well as remaining in the nesting areas) because more space is needed, so necessarily the average vegetation becomes less dense. Of course brooding habitats "are often found in areas with higher intensity grazing regimes;" that follows necessarily from their avoiding such areas for nesting. It is true that "Moderate grazing or other disturbance provides a mosaic of vegetation with more abundant forbs and more bare ground than in nesting habitat" but that has not been shown to relate to the birds' needs, which are perfectly well met for the birds that remain in the nesting areas. No study has ever shown any need for or advantage from a vegetational mosaic, unless by mosaic you refer to lek sites or grain fields, yet this false idea has become embedded in the literature. ...That "Brood-rearing locations are usually associated with higher levels of insect abundance" is not a comparison of brooding with nesting sites but of where prairie-chickens live vs. where they don't live, so has nothing to do with a mosaic; of course the birds live in grass-shrublands where insects are abundant rather than other vegetation where insects are less abundant.

Numerous studies on prairie grouse have demonstrated that habitat structural characteristics and availability of insects and forbs are the primary determinants of habitat selection by hens with broods. Similarly, habitat juxtaposition and vegetative cover have also been shown to influence habitat selection. Manley et al. (1995) noted, "The vegetation mosaic is a key ecosystem element when determining habitat suitability..." In many habitats, one of the most important consequences of disturbance regimes (e.g., grazing, fire) is to maintain landscape heterogeneity (Christensen 1988). Management practices that achieve an interspersed mosaic of food and cover suitable for LPCH and which recast the balance of native herbaceous species in degraded shinnery oak communities may be necessary for restoration of shinnery oak-grasslands, and ultimately, the restoration of LPCH populations and other species depending upon prairie grassland habitats.

Christensen, N. L. 1988. Succession and natural disturbance: paradigms, problems, and preservation of natural ecosystems. *In* Ecosystem management for parks and wilderness (J. K. Agee and D. R. Johnson, eds.). University of Washington Press, Seattle, Washington, USA.

Manley, P., G. E. Brogan, C. Cook, M. E. Flores, D. G. Fullmer, S. Husari, T. M. Jimerson, L. M. Lux, M. E. McCain, J. A. Rose, G. Schmitt, J. C. Schuyler, and M. J. Skinner. 1995. Sustaining ecosystems: a conceptual framework. USDA Forest Service, Pacific Southwest Region, R5-EM-TP-001.

- “I think...you're referring to the Natural Heritage Program (cf. pp. 60, 68).”

The Final Report has been amended to include this change.

- “Land ownership. This is somewhat confusing. The three big ownerships—private, BLM, and SLO—should be emphasized.”

The Final Report has been amended to provide this information.

- “Causes and patterns of mortality in lesser prairie-chickens, and other Sutton publications are relevant ([www.suttoncenter.org](http://www.suttoncenter.org)).”

The Final Report has been amended to include this information.

- “The claim that grazing is necessary to healthy grasslands is shaky enough; the claim that heavy grazing is essential strikes me as baloney. "...insufficient amount of ungrazed or lightly grazed areas are necessary." Line 12: "grass height and density.”

Grazing impacts LPCH habitats by changing the amount, kind, and pattern of residual grass. Uneven grazing patterns under season- and year-long continuous grazing is necessary to maintain landscapes that favor LPCH by creating a mosaic of short grass, bare ground, and tall, lightly grazed rangelands. This structural diversity facilitates movement of broods, abundant access to seeds and insects, and close escape cover (Bidwell et al. 2003).

Bidwell, T. G., S. Fuhlendorf, B. Gillen, S. Harmon, R. Horton, R. Manes, R. Rodgers, S. Sherrod, and D. Wolfe. 2003. Ecology and management of the lesser prairie-chicken in Oklahoma. Oklahoma State University Extension Circular E-970, Oklahoma Cooperative Extension Unit, Stillwater, Oklahoma, USA.

- “ I don't think it's true that ORV use is largely unrestricted across prairie-chicken range; most counties, like Chaves, have severe restrictions, as does BLM in some areas. But they're not enforced.”

Currently, 59% of historic LPCH range in New Mexico is privately held and are not managed for intensive ORV use. The goal of ORV management on public lands administered by the BLM is to provide adequate access and reduce adversity impacts on sensitive resource values (BLM 1997) Until implementation plans are prepared and enforced on public lands ORV use remains largely unrestricted.

- “Disease. I think that there's more information, or at least more citations, on the Sutton website ([www.suttoncenter.org](http://www.suttoncenter.org)).”

The Final Report has been amended to include this information.

**Davis, Dawn M., DGF**

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**From:** Rebecca Reiss  
**To:** Davis, Dawn M., DGF  
**Cc:** reiss@mailhost.nmt.edu  
**Subject:** Prairie Chicken Draft Report  
**Attachments:**

**Sent:** Fri 10/28/2005 12:20 PM

Ms Davis,

First, let me congratulate you on a well-written, well-organized report.

I have a major concern with the conclusions from the report. If the lesser prairie chicken (LPCH) is not listed under New Mexico's Wildlife Conservation Act (WCA), what is the fate of the current efforts to protect habitat for this species? The increase in populations in established wildlife habitat areas is commendable, but the reduction in roadside populations suggests that further habitat fragmentation is occurring and is likely to continue if the LPCH is considered safe from extirpation. It is clear from the genetic data that a reduction in genetic diversity has already occurred, and further reduction by isolation of populations will be very damaging to the health of the species as a whole.

Oil and gas exploration and extraction activities are a major concern since the pressure to find new reserves will only increase. In the Operational Accomplishments for 2003 and 2004, negotiations with Dynegy Midstream Services to resolve an authorized pipeline on the South Bluit Prairie-Chicken Area (PCA) (14.11-14.12, page 67 and 14.11- 14.13, page 75). The 2004 report mentions fence reconstruction and re-vegetation activities to address this problem were to be completed in the 2005 fiscal year, but its not clear whether these activities are complete. Oil spills in PCAs, such as those that occurred in the Gallina Wells areas (14.11-14.14, page 83) are of upmost concern. What recourse will the New Mexico Department of Game and Fish have if the LPCH is not listed as threatened?

If you have any additional questions, please feel free to contact me.

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**Response to Dr. Rebecca Reiss' peer-review, addressed in the order in which they appear in her letter:**

- “The increase in populations in established wildlife habitat areas is commendable, but the reduction in roadside populations suggests that further habitat fragmentation is occurring and is likely to continue if the LPCH is considered safe from extirpation.”

LPCH populations appear to have remained stable during 1998-2005 with no notable increases or decreases along roadside routes surveyed in the core area of remaining populations in south Roosevelt, north Lea, and east Chaves counties (Appendix I). While there has been considerable annual variation in the total number of leks detected and number of LPCH observed along the 29 roadside routes, fluctuations between years might be associated with variation in survey effort (e.g., observer consistency), changes in detection probability, and changes in lek attendance rates rather than variation in population size.

- “It is clear from the genetic data that a reduction in genetic diversity has already occurred, and further reduction by isolation of populations will be very damaging to the health of the species as a whole.”

Although birds from New Mexico had the fewest haplotypes in a range-wide evaluation of LPCH, and were markedly different from other populations, no deleterious effects to demographic rates have been documented in New Mexico populations (see Section 4.11). Further, analysis of both mtDNA and microsatellite data indicated that LPCH maintain high levels of genetic variation in east-central New Mexico (Van Den Bussche et al. 2003).

Van Den Bussche, R. A., S. R. Hoofer, D. A. Wiedenfield, D. H. Wolfe, and S. K. Sherrod. 2003. Genetic variation within and among fragmented populations of lesser prairie-chickens (*Tympanuchus pallidicinctus*). *Molecular Ecology* 12:675-683.

- “Oil and gas exploration and extraction activities are a major concern since the pressure to find new reserves will only increase.... The 2004 report mentions fence reconstruction and re-vegetation activities to address this problem were to be completed in the 2005 fiscal year, but its not clear whether these activities are complete. Oil spills in PCAs, such as those that occurred in the Gallina Wells areas (14.11-14.14, page 83) are of upmost concern.”

The Department recognizes that, once a valid mineral lease has been purchased, development of that lease cannot be precluded by regulatory means. However, development impacts can be greatly minimized through the establishment of negotiated guidelines and variety of mitigation strategies.

In recognition of the potential impacts of resource extraction on LPCH populations, local and seasonal restrictions on oil and gas developments have been placed on PCAs administered by NMDGF to protect LPCH. Drilling and 3-D geophysical exploration is not allowed in LPCH habitat between February 15th and June 30th each year and operation and maintenance activities can not occur from 3:00 am to 9:00 am to prevent disturbance to LPCH lekking activities.. Exhaust noise from pump jack engines must be muffled or otherwise controlled so operation noise will not exceed 75 db measured at 30 feet from the sources. In addition, surface occupancy or development will not be allowed within 200 m of known lek sites.

Oil spills are under the jurisdiction of the Oil Conservation Division, however, the Department will continue correspond with Energy, Minerals, and Natural Resources, BLM, and oil and gas companies operating on PCAs to mitigate impacts of energy exploration and development. Dynegy Midstream Services paid for a cultural resource survey and prepared necessary NEPA documents to re-build the boundary fence for South Bluit PCA. Fence construction has been completed and re-vegetation work was deemed unnecessary.