Tympanuchus pallidicinctus - (Ridgway, 1873)

Lesser Prairie-Chicken

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Related ITIS Name(s): *Tympanuchus pallidicinctus* (Ridgway, 1873) (TSN 175838)
Unique Identifier: ELEMENT_GLOBAL.2.101816
Element Code: ABNLC13020
Informal Taxonomy: Animals, Vertebrates - Birds - Other Birds

Kingdom	Phylum	Class	Order	Family	Genus
Animalia	Craniata	Aves	Galliformes	Phasianidae	Tympanuchus

Genus Size: B - Very small genus (2-5 species)

Check this box to expand all report sections: ☑

Concept Reference

Concept Reference: American Ornithologists' Union (AOU). 1998. Check-list of North American birds. Seventh edition. American Ornithologists' Union, Washington, DC. 829 pp.
Concept Reference Code: B98AOU01NAUS
Name Used in Concept Reference: *Tympanuchus pallidicinctus*
Taxonomic Comments: This species has been considered conspecific with *T. cupido* by some authors, but generally it is recognized as a distinct species. Genetically, the three species of *Tympanuchus* are not clearly distinct; evidently morphological and behavioral differentiation have progressed rapidly relative to either mtDNA or allozymes (Ellsworth et al. 1994).

Conservation Status

NatureServe Status

Global Status: G3
Global Status Last Reviewed: 29Sep2010
Global Status Last Changed: 24Aug2000
Rounded Global Status: G3 - Vulnerable
Reasons: This species has a small, fragmented range in the southwestern Great Plains region. Distribution and abundance have declined, primarily due to habitat loss, degradation, and fragmentation caused by incompatible grazing management, tree encroachment, conversion of rangeland to crop and non-native forage production, energy development, and increased disturbance. Habitat alteration and loss contribute to increased edge effect, habitat fragmentation, reduced habitat quality, reduced recruitment, increased predation, isolated populations, and possible genetic effects. These factors and others, such as disease, weather and climate change can exert a significant influence on lesser prairie-chicken distribution, particularly as population levels continue to decline. [Source: USFWS 2009]
Nation: United States
National Status: N3

U.S. & Canada State/Province Status	
United States	Colorado (S2), Kansas (S2), Nebraska (SX), New Mexico (S2B,S2N), Oklahoma (S1), Texas (S2B)

Other Statuses

U.S. Endangered Species Act: C: Candidate (12Sep2006)

U.S. Fish & Wildlife Service Lead Region: R2 - Southwest
IUCN Red List Category: VU - Vulnerable
Comments on official statuses: In response to a petition to list as threatened submitted in October 1995, was added to USFWS candidate species list in June 1998 (USFWS 1998).

NatureServe Conservation Status Factors

Population Size: 10,000 - 100,000 individuals
Population Size Comments: Recent population estimate for each state are as follows (see USFWS 2009): Colorado: 1,500 (in 2000); Kansas: 19,700-31,100 (in 2006); New Mexico: 9,443 (in 2008); Okalhoma: < 3,000 (in 2000); Texas: 6,077-24,132 (in 2007). Total population based on these estimates is approximately 39,720-69,175.

Estimated Number of Occurrences: 81 - 300
Estimated Number of Occurrences Comments: The precise number of distinct occurrences (subpopulations) has not been determined but probably exceeds 80. If one assumes 20 males and females per lek and a total breeding population of 33,000-50,000, a rough estimate of 1,650-2,000 leks results. This is probably somewhat low. However, occurrences would normally include several leks, given a separation distance of 15 km.

Global Short-term Trend Comments: Populations can fluctuate considerably from year to year as natural responses to variable weather and habitat conditions; these fluctuations add to the difficulty of evaluating population trends, particularly short-term trends (USFWS 2009). Thus trend over the past 10 years or three generations (which is 10 years or less) probably is not a good basis for evaluating conservation status.

Global Long-term Trend: Large decline (decline of 75-90%)
Global Long-term Trend Comments: Maximum occupied range, prior to European settlement, has been estimated by state wildlife agencies at approximately 456,087 sq km; current occupied range recently was estimated at 64,414 sq km (Playa Lakes Joint Venture 2007, USFWS 2009). This indicates that the historical occupied range has been reduced by 86 percent.

The overall distribution has sharply declined in all states except Kansas (USFWS 2009).

Historical population size is not well documented, but this species reportedly was quite common throughout the range in Colorado, Kansas, New Mexico, Oklahoma, and Texas in the early twentieth century. By the 1930s, the species had begun to disappear from areas where it had been considered abundant. Abundance appeared to fluctuate somewhat during the 1940s and 1950s (see USFWS 2009), and by the early 1970s the total fall population may have been reduced to about 60,000 birds (Crawford 1980). By 1980, the estimate of the total fall population was approximately 44,000 to 53,000 birds (Crawford 1980).

Number of Protected and Managed Occurrences (Global): Few to several (1-12) occurrences appropriately protected and managed
Global Protection Comments: Relatively few protected breeding areas exist, and those that exist may be poorly protected.

Currently, 95 percent (61,193 square kilometers (sq km) of occupied range is privately owned; 4 percent (3,221 sq km) is managed by the Bureau of Land Management (BLM) in New Mexico and the U.S. Forest Service in Colorado, Kansas, Oklahoma, and New Mexico; 1 percent is State trust land in New Mexico (USFWS 2009).

Because most lesser prairie-chicken habitat destruction and modification on private land occurs through otherwise lawful activities such as agricultural conversion, livestock grazing, energy development, and fire exclusion, few if any regulatory mechanisms are in place to substantially alter human land uses at a sufficient scale to protect lesser prairie-chicken populations and their habitat (USFWS). Existing regulatory mechanisms at the federal and state level have not been sufficient to preclude the decline of the species (USFWS 2009).

Overall Threat Impact: Moderate and imminent threat
Overall Threat Impact Comments: HABITAT: The primary threat is habitat loss, fragmentation, and degradation, principally due to the conversion of native sand sagebrush and shinnery oak rangeland to cropland and "improved" pastures, overgrazing, and brush control (Crawford 1980, Hamerstrom and Hamerstrom 1961, Jones 1964b, Mote et al. 1999, Taylor and Guthery 1980b). Areas with greater than 20-37 percent cultivation may be incapable of supporting stable populations (Crawford and Bolen 1976). Habitat fragmentation is detrimental for several reasons: fragments may be smaller than needed home range size (Samson 1980); necessary habitat diversity may be lost, and the probablility of recolonization decreases as distance from nearest patch increases (Wilcove et al. 1986, Knopf 1996). Fragmentation also renders nests more susceptible to predation (Mote et al. 1999). Patten et al. (2005) suggested that increased habitat fragmentation in Oklahoma resulted in higher rates of mortality than in the less fragmented habitat in New Mexico.

The possible conversion of over a million acres of currently enrolled CRP grasslands within the next two years has the potential to cause the destruction or modification of 14 percent of occupied habitat (USFWS 2009).

Development of wind energy and construction of associated infrastructure are occurring within occupied portions of lesser prairie-chicken habitat and are expected to continue. Such development renders the affected areas unsuitable for prairie-chickens, even if many of the typical habitat components used by prairie-chickens remain (USFWS 2009). Telemetry research indicates that prairie-chickens exhibit

strong avoidance of tall vertical features such as utility transmission lines Robel 2002, Pitman et al. 2005). Robel (2002) estimated that, for greater prairie-chickens, a single wind turbine may create a habitat avoidance zone that extends as far as one mile. Pitman et al. (2005) found no lesser prairie-chicken nesting or brood rearing within 300 meters of power lines. This research also found no nesting or lekking within 0.8 km of a gas line compressor station. Lesser prairie-chickens generally avoided human activity and seldom nested within 0.4 km of inhabited dwellings, and they avoided habitat within a 1.6 km radius of a coal-fired power plant (Pitman et al. 2005). Oil and gas development also are causing loss and degradation of occupied habitat (USFWS 2009).

DROUGHT: Drought may impact lesser prairie-chikens through its effect on seasonal growth of vegetation necessary to provide nesting and roosting cover, food, and opportunity for escape from predators (USFWS 2009). Drought may render small, fragmented populations more vulnerable to extirpation.

GRAZING: Grazing is not necessarily detrimental, but overgrazing reduces residual grass cover, an important component of nesting habitat, and reduces food plant availability (Bent 1932; Cannon and Knopf 1980; Crawford 1980; Davis et al. 1979, cited in Giesen 1998; Giesen 1994a; Riley et al. 1992). In New Mexico, Patten et al. (2006) found that grazing did not have an overall influence on where prairie-chickens occurred within their study areas, but there was evidence that the birds did not nest in portions of the study area subjected to cattle grazing. Rangeland improvement designed to increase grass cover by reducing shrub density using herbicides removes important food sources and nesting cover (Jackson and DeArment 1963, Haukos and Smith 1989).

ALIEN SPECIES: Ring-necked pheasants are known to disrupt the breeding behavior of greater prairie-chickens on leks and lay eggs in greater prairie-chicken nests. Anecdotal reports suggest similar pheasant-lesser prairie chicken interactions (USFWS 1998). More research is needed to understand and quantify impacts of pheasants on lesser prairie-chickens (USFWS 2009).

Additionally, the continued loss and degradation of currently occupied habitat in several areas in the form of heavy grazing by livestock, woody invasion due to fire suppression, oil and gas development, and fragmentation are rendering portions of previously occupied range uninhabitable for the species.

The following factors could become important in populations that have declined to small size as a result of the foregoing threats:

PREDATION: Confirmed predators of eggs/nests include Chihuahuan raven, coyote, badger, striped skunk, spotted ground squirrel, and bullsnake; predators of chicks and adults include rough-legged hawk,red-tailed hawk, ferruginous hawk, prairie falcon, Cooper's hawk, northern harrier, golden eagle, great horned owl, coyote, and badger (Campbell 1950, Giesen 1998, USFWS 1998).

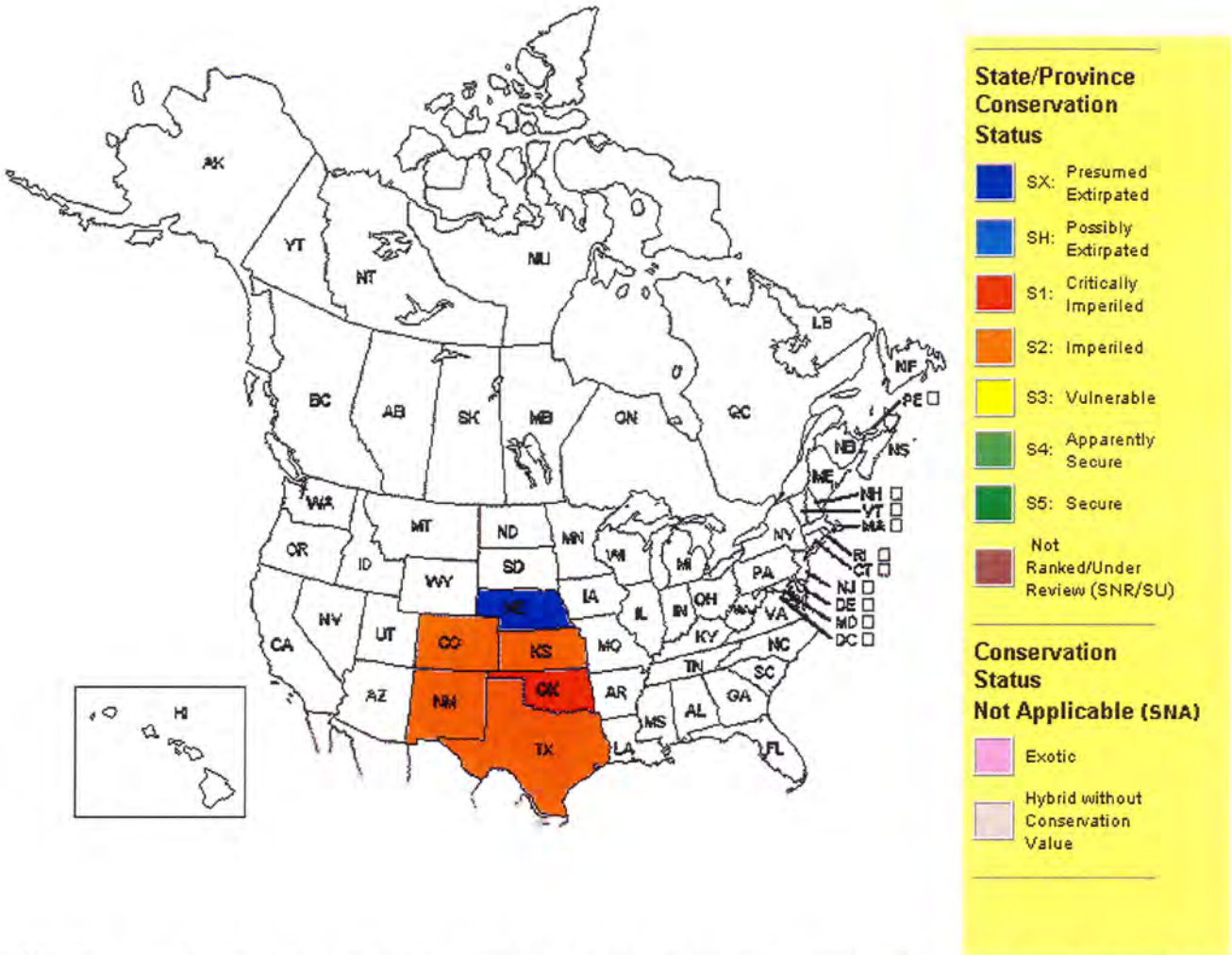
PARASITES: Known endoparasites include nematodes and cestodes (see Giesen 1998).

Fragility: Not intrinsically vulnerable

Environmental Specificity: Moderate. Generalist or community with some key requirements scarce.

Distribution

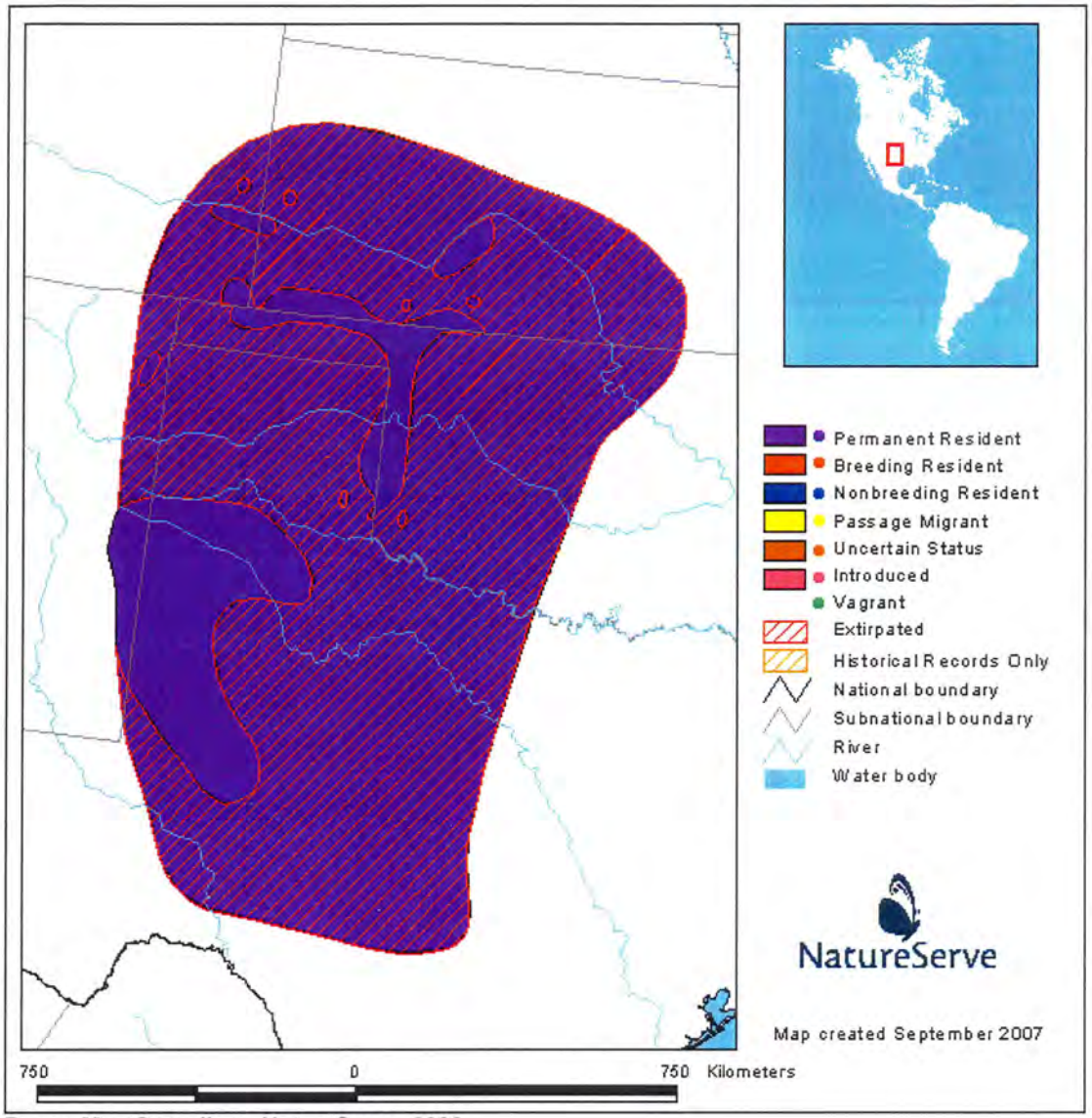
U.S. States and Canadian Provinces



NOTE: The maps for birds represent the breeding status by state and province. In some jurisdictions, the subnational statuses for common species have not been assessed and the status is shown as not-assessed (SNR). In some jurisdictions, the subnational status refers to the status as a non-breeder; these errors will be corrected in future versions of these maps. A species is not shown in a jurisdiction if it is not known to breed in the jurisdiction or if it occurs only accidentally or casually in the jurisdiction. Thus, the species may occur in a jurisdiction as a seasonal non-breeding resident or as a migratory transient but this will not be indicated on these maps. See other maps on this web site that depict the Western Hemisphere ranges of these species at all seasons of the year.
Endemism: endemic to a single nation

U.S. & Canada State/Province Distribution	
United States	CO, KS, NE, NM, OK, TX

Range Map
Note: Range depicted for New World only. The scale of the maps may cause narrow coastal ranges or ranges on small islands not to appear. Not all vagrant or small disjunct occurrences are depicted. For migratory birds, some individuals occur outside of the passage migrant range depicted. A shapefile of this map is available for download at **www.natureserve.org/getData/animalData.jsp.**



Range Map Compilers: NatureServe, 2002

Global Range: 20,000-200,000 square km (about 8000-80,000 square miles)
Global Range Comments: Historical range extended from southeastern Colorado and southwestern Kansas southward through western Oklahoma to southeastern New Mexico and western Texas (Hagen and Giesen 2005, USFWS 2009). Currently, the species is discontinuously distributed within a small portion of the historical range, including all five of these states. Formerly the species ranged north to southwestern Nebraska, but there is no evidence of breeding in that state, and the species' ephemeral occurrence there may have been an artifact of post-settlement habitat changes (AOU 1983, Giesen 1998).

Natural heritage records exist for the following U.S. counties ?	
State	**County Name (FIPS Code)**
CO	Baca (08009), Cheyenne (08017), Kiowa (08061), Prowers (08099)
KS	Barber (20007), Clark (20025), Comanche (20033), Edwards (20047), Finney (20055), Grant (20067), Hamilton (20075), Kiowa (20097), Meade (20119), Morton (20129), Stevens (20189), Wallace (20199)
NM	Chaves (35005), Curry (35009), DeBaca (35011), Eddy (35015), Lea (35025), Roosevelt (35041)
OK	Beaver (40007), Beckham (40009), Custer (40039), Dewey (40043), Ellis (40045), Harper (40059), Major (40093)*, Roger Mills (40129), Texas (40139)*, Woods (40151)*, Woodward (40153)
TX	Lipscomb (48295)

* Extirpated/possibly extirpated

U.S. Distribution by Watershed (based on available natural heritage records) ?	
Watershed	**Watershed Name (Watershed Code)**

Region	
10	Smoky Hill Headwaters (10260001)+
11	Upper Arkansas-John Martin (11020009)+, Big Sandy (11020011)+, Rush (11020012)+, Two Butte (11020013)+, Middle Arkansas-Lake Mckinney (11030001)+, Coon-Pickerel (11030004)+, Rattlesnake (11030009)+, Upper Cimarron (11040002)+, Sand Arroyo (11040004)+, Bear (11040005)+, Upper Cimarron-Liberal (11040006)+, Crooked (11040007)+, Upper Cimarron-Bluff (11040008)+, Lower Cimarron-Eagle Chief (11050001)+, Upper Salt Fork Arkansas (11060002)+, Middle Canadian-Spring (11090106)+, Lower Canadian-Deer (11090201)+, Middle Beaver (11100102)+, Lower Beaver (11100201)+, Lower Wolf (11100203)+, Middle North Canadian (11100301)+, Middle North Fork Red (11120302)+, Washita headwaters (11130301)+
12	Yellow House Draw (12050001)+, Lost Draw (12080001)+
13	Upper Pecos (13060003)+, Arroyo Del Macho (13060005)+, Upper Pecos-Long Arroyo (13060007)+, Upper Pecos-Black (13060011)+, Landreth-Monument Draws (13070007)+

+ Natural heritage record(s) exist for this watershed
* Extirpated/possibly extirpated

Ecology & Life History

Basic Description: A chunky chickenlike bird (grouse, prairie-chicken).
Reproduction Comments: In spring and fall, adults congregate on leks where males engage in communal courtship displays at sunrise and before sunset (Giesen 1998). In Oklahoma, males have been observed on leks in every month except August and December (Jones 1964a). Dominant (usually older) males establish and defend territories in the central portion of the lek, whereas subordinant (typically younger) males are generally restricted to peripheral territories. The number of males attending a lek varies seasonally and annually, and is influenced by habitat and population density (Giesen 1998). In Colorado, the average number of males per lek was 9.4 (range = 1 - 42); in Texas, it was 13.7 (range = 1 - 43; Copelin 1963, cited in Giesen 1998; Giesen 1998). Females attend leks to copulate with males from late March through May.

Nesting is initiated from mid-April through late May, usually within two weeks of lek attendance, and hatching peaks from late May through mid-June (Bent 1932, Giesen 1998). If the first clutch is destroyed, second nesting attempts are initiated from late May through early June, with hatching extending through early July (Giesen 1998).

The nest is a 20-centimeter-wide bowl-shaped depression constructed 8-10 centimeters deep in the substrate and lined with dried grasses, leaves and feathers. Nests are often constructed on north- or northeast-facing slopes, presumably for protection from prevailing southwest winds and direct sunlight (Giesen 1998). Females typically nest 1.2-3.4 kilometers (range 0.2-13.9, n = 90 nests) from a lek.

One egg is laid per day and incubation begins when the clutch is complete. The average clutch size for 60 complete clutches is 10.4 eggs (range = 8 - 14; Giesen 1998). Eggs are incubated by hens only for 23-26 days and the young leave the nest within hours of hatching (Giesen 1998, USFWS 1998). Nest success (percent clutches that hatch greater than one egg) averaged 28 percent (range 0 - 67 percent) for ten studies (Giesen 1998). Nesting success is better in wetter years than drier years and among denser, taller grass than sparser, shorter grass (Davis et al. 1979, cited in Giesen 1998; Merchant 1982, cited in Giesen 1998; Riley et al. 1992). Droughts and hot, dry weather during nesting season may negatively impact hatching success (Giesen 1998).

Juveniles are capable of short flight within two weeks and broods remain with females for 12-15 weeks (Giesen 1998). Broods usually move less than 300 meters per day and range over 42-118 hectares (Giesen 1998). Average distance from nearest lek was similar for successful and unsuccessful nests; nests closer or farther than average from leks were less successful (Phillips 1990). Females apparently breed at one year of age; although yearling males are physiologically capable of breeding, older males do most of the breeding (Giesen 1998).
Ecology Comments: This species may form flocks of up to 80 individuals in fall and winter (Copelin 1963, cited in Giesen 1998). Spring density estimates for males range from 0.31-2.24 per square kilometer in Colorado (Giesen 1998, Hoffman 1963), 0.19-11.82 per square kilometer in Oklahoma (Cannon 1980, cited in Giesen 1998; Copelin 1963, cited in Giesen 1998; Davison 1940), 1.74-1.87 per square kilometer in New Mexico (Locke 1992, cited in Giesen 1998), and 1.41-1.98 per square kilometer in Texas (Sell 1979, cited in Giesen 1998). Line transect estimates for all birds in New Mexico ranged from 20-25 per square kilometer in summer to 34-53 per square kilometer in winter (Olawsky and Smith 1991). The average lek density, rangewide is 0.1-0.43 per square kilometer (Giesen 1998).

Sex ratio estimates are generally male-biased, which could be due to unknown differences between the sexes in susceptibility to harvest or habitat preferences (Taylor and Guthery 1980b). Sex ratio estimates (males:females) range from 1.0:0.61 - 1.0:0.71 for young netted in coveys from July through September (Davison 1940), 1.0:0.77 for 1718 hunter-killed birds (Snyder 1967 cited in Giesen 1998), 1.0:0.73 for 2447 hunter-killed birds (Campbell 1972), and 1.0:1.0 for 923 hunter-killed birds (Lee 1950). Campbell (1972) estimated a 65 percent annual mortality rate and a five-year maximum life span.
Habitat Type: Terrestrial
Non-Migrant: Y
Locally Migrant: N
Long Distance Migrant: N
Mobility and Migration Comments: This species is regarded as nonmigratory; however, there are unconfirmed reports that the Texas portion of the population may have been migratory at one time (Jackson and DeArment 1963).

Home range sizes vary according to sex, time of year, and reproductive activity. During spring and summer in Colorado, females ranged

over 496 hectares whereas males, who stayed closer to leks, ranged over 211 hectares (Giesen 1998). In Texas during winter, males occupied 50-1945 hectares and moved 0.39-1.07 kilometers per day, whereas females used 35-495 hectares and moved 0.27-1.23 kilometers per day (Taylor and Guthery 1980a). In New Mexico, pre-nesting females ranged over an average of 231 hectares and moved an average of 390 meters per day, nesting females used an average of 92 hectares and moved an average of 250 meters per day, females with broods occupied a mean of 119 hectares and moved an average of 280 meters per day, and females without broods used an average of 73 hectares and moved a mean of 220 meters per day (Riley et al. 1994). Males on leks defend territories ranging in size from less than 40 to more than 150 square meters (Hjorth 1970, cited in Giesen 1998).

Males exhibit fidelity to leks between breeding seasons. In New Mexico, 96.5 percent of males captured on leks were recaptured on the same lek the following year (Campbell 1972). In addition, males may occupy the same territory within a lek in subsequent years (Giesen 1998). Site fidelity has also been observed in females. One female, captured in Kansas and released in Colorado, returned nearly 300 kilometers to her original capture site (Giesen 1998). Maximum movements between spring leks and late-fall relocations was 20.8 kilometers for subadults and 3.2 kilometers for adults (Campbell 1970). One juvenile moved 12.8 kilometers from the lek where it was captured 5 days prior (Taylor and Guthery 1980c).
Habitat Comments: Lesser prairie-chickens inhabit mixed grass-dwarf shrub communities that occur on sandy soils; principally the sand sagebrush (*Artemisia filifoilia*)-bluestem (*Andropogon* spp.) association in Colorado, Kansas, and Oklahoma, and to a lesser extant, Texas and New Mexico; and the shinnery oak (*Quercus havardii*)-bluestem association in Oklahoma, Texas, and New Mexico (Giesen 1998, Hoffman 1963, Jackson and DeArment 1963, Taylor and Guthery 1980 Riley et al. 1992, Fuhlendorf et al. 2002, Johnson et al. 2004, Bell 2005, Patten et al. 2005). Leks typically occur on knolls or ridges with relatively short and/or sparse vegetation (Giesen 1998, Jones 1963, Taylor and Guthery 1980b). Lesser prairie-chicken leks may be on human-created open areas (e.g., oil well pads, roads, reverted cropland, cultivated fields, and areas treated with herbicides; Crawford and Bolen 1976, Taylor 1980) and recently burned areas (Cannon and Knopf 1979).

Nesting sites are in sand sagebrush or shinnery oak grasslands with high canopy cover and moderate vertical and horizontal cover, primarily residual vegetation (Giesen 1998). Females prefer to nest in relatively tall, dense vegetation (Giesen 1994b, Riley et al. 1992, Wisdom 1980 cited in Giesen 1998). Nests often are under sand sagebrush or shinnery oak shrub (Bent 1932; Davis et al. 1979, cited in Giesen 1998; Giesen 1994b; Sell 1979, cited in Giesen 1998) or amid tall bunchgrasses (*Andropogon*, *Aristida*, *Schizachyrium*; Haukos and Smith 1989; Riley 1978, cited in Giesen 1998; Wisdom 1980, cited in Giesen 1998). Height and density of forbs and residual grasses are greater at nest sites than on adjacent rangeland (Davis et al 1979, cited in Giesen 1998; Giesen 1994b; Haukos and Smith 1989; Riley et al. 1992).

Average height of vegetation and grasses at 29 nests in sand sagebrush rangeland in Colorado was 50.7 centimeters and 36.1 centimeters, respectively. Twenty nests (69 percent) were under sand sagebrush or small yucca (*Yucca glauca*) and nine (31 percent) in bunchgrasses, principally (n = 5) sand dropseed (*Sporobolus cryptandrus*). Shrub, forb, and grass height at nests was significantly greater than along transects (Giesen 1994b). In shinnery oak rangeland in Oklahoma, vegetation height above one nest ranged from 32-52 centimeters (USFWS 1998). Mean height of vegetation above one nest in sand sagebrush rangeland in Oklahoma was 45 centimeters (USFWS 1998). Average plant height above 13 nests in shinnery oak rangeland of the Texas panhandle was 45.3 centimeters; nine nests (69 percent) were in purple threeawn (*Aristida purpurea*; Haukos and Smith 1989). Mean height of vegetation above successful nests (n = 10) in shinnery oak rangeland of New Mexico was 66.6 centimeters, whereas mean height of vegetation at unsuccessful nests (n = 26) was 34.9 centimeters (Riley et al. 1992). Four (40 percent) of the successful nests were located in sand bluestem (*Andropogon hallii*).
Food Comments: Diet includes insects (including insect galls), seeds, acorns, vegetative material (e.g., leaves, buds, flowers, catkins), and cultivated grains (e.g., sorghum; Taylor and Guthery 1980b, Giesen 1998). In New Mexico, crops of adults examined in spring contained 94 percent plant material and 6 percent animal material. Seventy-nine percent of the plant material was green vegetation and 15 percent was shinnery oak acorns. During the summer months, crops contained 55 percent insects (especially grasshoppers [Orthoptera] and treehoppers [Homoptera]), 23 percent green vegetation and 21 percent acorns. The diet of chicks and juveniles was 99-100 percent insects (Davis et al. 1980). Shinnery oak (acorns, leaves, catkins, galls) composed 49 percent of the spring diet, 22.5 percent of the summer diet, 50 percent of the fall diet and 70 percent of the winter diet (Davis et al. 1979, cited in Davis et al. 1980; Davis et al. 1980). In Oklahoma, the proportion (in percent) of animal to plant material in the diet of adults was 7:93 in winter, 19:81 in spring, 67:33 in summer, and 17:83 in fall (Martin et al. 1951). By analyzing 1129 droppings collected throughout the year in Oklahoma, Jones (1963, 1964a) reported that major components of the diet included seeds (24.5 percent), green vegetation (33.5 percent), and insects (42 percent). In Oklahoma, the diet of juveniles up to one month old was comprised of insects (97.7 percent) and plants (2.3 percent; Jones 1963). Lesser prairie-chickens obtains moisture from food and drink water provided for cattle (Crawford and Bolen 1973, Giesen 1998, Jones 1964a).
Colonial Breeder: Y
Length: 41 centimeters
Weight: 784 grams

Economic Attributes **Not yet assessed**

Management Summary

Stewardship Overview: USFWS (2009) recommended the following conservation measures: 1. Reduce or eliminate upland construction of fence lines and utility lines within occupied habitat and for 8 km surrounding all occupied habitat, especially near leks. If fence lines cannot be removed, it is recommended that the top and third wires of lines near active leks be conspicuously marked to minimize collision mortality. 2. Limit or eliminate the federally-funded application of tebuthiuron herbicide in remaining shinnery oak habitats and 2, 4-D herbicide in sand sagebrush habitats. 3. Encourage rangewide adherence to the USFWS's Voluntary Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines, released in July 2003, (http://www.fws.gov/habitatconservation/wind.pdf). 4. Work cooperatively with energy-related industry to avoid, minimize, and

compensate for impacts to lesser prairie-chicken populations and habitats. 5. Work with partners to target re-enrollments and new contracts under CRP and related agricultural conservation programs to benefit LPC. 6. Minimize further fragmentation of remaining Federal lands within current and historic al lesser prairie-chicken range by abandoning the use of ineffective timing, noise, and distance stipulations near active or historic leks. Instead, future energy leasing, exploration, and development, or other fragmenting human land uses within essential lesser prairie-chicken habitats should be limited. 7. Establish secure and well-funded financial incentive mechanisms for private landowners to provide light to moderately grazed native rangeland habitats that are suitable for lesser prairie-chicken use but not subject to herbicidal shrub control practices. 8. Encourage increased use of prescribed fire and patch burn grazing concepts to facilitate habitat heterogeneity in lesser prairie-chicken range and decrease encroachment of woody vegetation. Patch burn grazing is a system that utilizes prescribed fire to encourage intensive grazing on a portion of a pasture each year while resting the remainder of the pasture.

See Hagen et al. (2004) for guidelines for managing lesser prairie-chickens and their habitats. See USFWS (2009) for a summary of recent conservation actions.
Restoration Potential: Restoration potential apparently is not good as all attempts to establish new populations have failed (Giesen 1998).

Rodgers and Hoffman (2005) emphasized the importance of Conservation Reserve Program (CRP) habitat to the status and survival of lesser prairie-chickens. They determined that the presence of CRP lands that had been planted to native species of grasses facilitated the expansion of lesser prairie-chicken range in Colorado, Kansas, and New Mexico. The range expansion in Kansas resulted in strong population increases there. In Oklahoma and Texas, and some portions of New Mexico, where CRP fields were planted with a monoculture of introduced grasses, lesser prairie-chickens did not demonstrate a range expansion or an increase in population size (Rodgers and Hoffman 2005).
Preserve Selection & Design Considerations: A mixture of tall, dense grass/shrubs and sparse, short vegetation provides optimal habitat.

The specific extent of habitat needed to sustain a viable population is unknown (USFWS 2009), but management units of 20 square kilometers and 32-72 square kilometers have been recommended based on studies of spring-summer and fall-winter habitat use, respectively (Sell 1979, cited in Taylor and Guthery 1980a; Taylor and Guthery 1980a). Most researchers agree that contiguous areas of at least 32 square kilometers in size having at least 63 percent rangeland habitat maintained as good quality shrub/grassland is needed to support populations long-term (Mote et al. 1999). Because lesser prairie-chickens usually nest within three kilometers of a lek, buffer zones and other restrictions on activities should be set up within this distance (Giesen 1998, USFWS 1998). Lesser prairie-chickens typically nest and rear their broods in proximity to a lek other than the one used for mating (Giesen 1998), so a complex of two or more leks is likely required to sustain a viable population (USFWS 2009).

Management Requirements: This species requires a mixed-grass community with a high percentage of forbs and scattered low shrubs (Doerr and Guthery 1980). This community type can be promoted and maintained with proper grazing management and careful use of herbicides or prescribed fire (Mote et al. 1999, Taylor and Guthery 1980b). Judicious use of herbicides can reduce shrub density and increase grass and forb density on overgrazed ranges. However, herbicides should not be applied unless perennial grasses are present, otherwise, grasses of little use to prairie-chickens as forage or otherwise will dominate (Doerr and Guthery 1980). Because of their importance as food sources and cover, no more than 50-70 percent of the shrubs should be eliminated from treated areas (Doerr and Guthery 1980). Herbicide treatment to control shinnery oak might adversely impact nesting lesser prairie-chickens (Johnson et al. 2004). Olawsky and Smith (1991) recommend a mosaic of treated and untreated areas.

Prescribed burns result in increased green forage, native annual forbs, and insect abundance. Burns should be limited to 20-33 percent of the management unit to preserve residual nesting cover (Bidwell et al. 1995, cited in Mote et al. 1999). Cattle exclosures can be used to prevent complete habitat loss or degradation from overgrazing (Taylor and Guthery 1980b). Food plots are not recommended because they are seldom used and do not increase population size (Copelin 1963, cited in Taylor and Guthery 1980b; Giesen 1998). Artificial leks can be created in extensive blocks of homogeneous habitat where natural leks are absent. Such leks should be at least 1.2 kilometers apart and on slightly elevated ground with short, scattered vegetation (Taylor 1980). High quality nesting habitat has an abundance of tall grasses (greater than or equal to 50 centimeters tall; Giesen 1994b; Riley et al. 1992; Wisdom 1980, cited in Giesen 1998). In order to improve or maintain optimum nesting cover, grazing utilization levels should be less than 25-35 percent of the annual growth of forage species (Riley et al. 1992, Riley et al. 1993). Although free-standing water is used, its availability is not critical for survival (Giesen 1998).
Monitoring Requirements: Spring counts of males displaying on leks are used to track population trends (Crawford and Bolen 1975). April and May are the best months to conduct lek counts because breeding activity is at its peak. Counts conducted from dawn to about two hours after daylight on calm, clear days are most accurate (Taylor and Guthery 1980b). Because the number of active leks correlates with the density of displaying males, the number of active leks can be also used as an index of population trends (Cannon and Knopf 1981). Line transects are sometimes used to estimate population density (Olawsky and Smith 1991, Riley et al. 1993).

Management Programs: Populations are managed on federal and state lands in each inhabited state by relevant state or federal wildlife agencies (Mote et al. 1999, USFWS 1998). A conservation plan has been drafted by The Lesser Prairie Chicken Interstate Working Group (Mote et al. 1999).
Monitoring Programs: Populations are monitored in each inhabited state by state wildlife agencies (Mote et al. 1999, USFWS 1998). Because lesser prairie-chickens are encountered so infrequently on North American Breeding Bird Survey routes or Christmas Bird Counts, these surveys are not adequate to detect population changes (Sauer et al. 1994).
Management Research Programs: Management research programs are conducted by state agencies and universities throughout the range. Telemetry studies of habitat use, as well as studies of diseases and genetics have been conducted in Oklahoma and New Mexico by the Sutton Avian Research Center. Telemetry studies and studies of parasites and diseases have been conducted in Kansas.
Management Research Needs: Most occupied habitat occurs on private lands, so much of the future of this species rests in the hands

of private landowners. It is imperative to develop a means of implementing management practices beneficial to this species while preserving landowner ability to derive income from the land (Mote et al. 1999).

Research is needed on the following topics: relationship between lek counts and total population size; genetic variability among populations; dispersal ability (particularly in fragmented landscapes); population and metapopulation dynamics; minimum viable population size; minimum habitat patch size; and the effects of various land management practices on survival, productivity, and seasonal habitat preferences (Giesen 1998). In addition, successful transplantation techniques need to be developed and implemented (Taylor and Guthery 1980b), and the possible impact of ring-necked pheasant competition/reproductive interference needs study (USFWS 1998).

Population/Occurrence Delineation

Group Name: GROUSE AND PTARMIGAN

Use Class: Not applicable
Subtype(s): Lek, Nesting Area, Nesting Season Foraging Area, Nonbreeding Habitat, Year-round Habitat
Minimum Criteria for an Occurrence: Evidence of historical presence, or current and likely recurring presence, at a given location, minimally a reliable observation of one or more birds in appropriate habitat.
Mapping Guidance: To the extent possible and practicable, occurrences should encompass the annual range of a population. If winter and summer ranges are distinctly separate, map using separate polygons. If they are more than 15 kilometers apart, separate breeding and nonbreeding occurrences should be created.
Separation Barriers: None.
Separation Distance for Unsuitable Habitat: 5 km
Separation Distance for Suitable Habitat: 15 km
Separation Justification: Unsuitable habitat includes open water as well as other habitats through or over which birds may travel but in which they do not nest or forage much if at all.

Occurrences are difficult to circumscribe because most species are partially migratory (i.e., some individuals migrate small or large distances whereas others are relatively sedentary) (see Schroeder and Braun 1993). Migrations may extend up to 12 kilometers in Blue Grouse (Pelren 1996), up to about 40 km (usually less than 25 km) in Greater Prairie-Chickens in Colorado (Schroeder and Braun 1993), and up to 170 km in Greater Prairie-Chickens in Wisconsin.

Adult male (and probably adult female) Lesser Prairie-Chickens have high fidelity to breeding leks (Giesen 1998), and some leks have persisted more than 30 to 40 years (Copelin 1963, Giesen 1998). Largest individual home ranges recorded are of males in winter; in Texas, these ranged from 331-1945 hectares (n = 4; Taylor and Guthery 1980a). Maximum movements between spring leks and late-fall relocations was 20.8 kilometers for subadults and 3.2 kilometers for adults (Campbell 1970). Combined home ranges of males and females associated with breeding leks ranged from 25.2 to 61.9 square kilometers (minimum convex polygon) in Colorado (n = 4 leks; Giesen 1991).

Female Greater Prairie-Chickens (T. c. attwateri) had winter home ranges as large as 910 hectares (Horkel 1979). Median female home range in late spring was 266 hectares (Schroeder 1991).

Summer home ranges of sharp-tailed grouse range from 13 to 406 hectares (summarized by Connelly 1998). Individuals generally fly less than 5 kilometers to a winter range (Giesen and Connelly 1993), but can fly up to 20 kilometers (Meints 1991). Some ptarmigan (e.g. Rock in northern North America) can be considered migratory.

Greater Sage-Grouse: average nest to lek distance about 3 kilometers (Connelly et al. 2000).

Separation distance is somewhat arbitrary and is less than the extent of known seasonal movements of some species. However, a longer separation distance in many cases likely would yield unreasonably large occurrences or, for some species, might join separate populations as single occurrences. Note that locations separated by a gap exceeding the separation distance should be treated as the same occurrence if there is evidence indicating that such patches encompass the same population (e.g., individuals are known to migrate between the patches).
Date: 26Apr2004
Author: Hammerson, G., and S. Cannings

Population/Occurrence Viability

Justification: Use the Generic Element Occurrence Rank Specifications (2008).
Key for Ranking Species Element Occurrences Using the Generic Approach (2008).

U.S. Invasive Species Impact Rank (I-Rank)

Not yet assessed

Authors/Contributors

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Feedback Request: NatureServe encourages users to let us know of any errors or significant omissions that you find in the data through (see **Contact Us**). Your comments will be very valuable in improving the overall quality of our databases for the benefit of all users.

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