

Greater Prairie-chicken Fact Sheet

Greater Prairie-chicken (GPC)

Scientific name: *Tympanuchus cupido*

Conservation status: Is a game bird in Kansas, Colorado, Minnesota, South Dakota, and Nebraska. North Dakota previously had a season but cancelled it due to low numbers of birds.

Appearance: 16.5 – 18 " long; wingspan of 28 " ; they weigh an average of 2 lbs. Both genders have blackish pinnate feathers on each side of the throat (= "pinnated grouse"); brownish head has slight crest, fleshy, orange-colored eyebrows, feet feathered to toes; toes yellow; bill brown; eyes hazel; male has bare yellowish orange "sacs" (enlarged esophagus or esophageal sacs) on sides of throat called "tympani" inflated in courtship; in female, neck sacs are very small, with much less color.

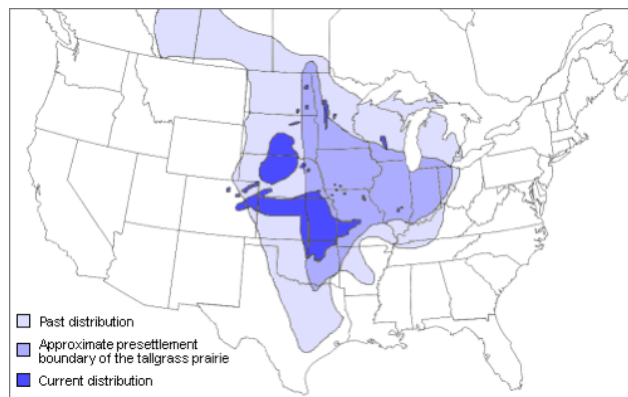
Life Span: 2 – 3 years.

Diet: Insectivorous (grasshoppers) when insects are available – but will also eat fruit, leaves, flowers, shoots, seeds (corn, oats, wheat, rye, sorghum, grass), and are very fond of rose hips.

Range: See the map to the right. Their range has contracted dramatically and with the loss of habitat there is on-going declines of bird numbers due to fragmentation of the land. Prairie-chickens require large, contiguous prairie (approx. 20,000 – 30,000 acres) to thrive and small, disjunct parcels of land aren't conducive to their survival.

Suitable habitat: Grassland areas – specifically, tallgrass.

Lek sites: Males display in areas (50 – 100 yards in diameter) = "leks" (Swedish for "dance") where their visibility and vocalizations to females are maximized along with their security from mammalian (coyote) and avian (falcons, hawks) predators. They want to be seen but they also need to see. GPCs display in areas of bare ground or short (<15 cm) cover – areas where cover has been reduced by burning, mowing, grazing, or cultivation. Leks are often near taller grasses into which males can escape easily and rapidly if danger approaches.



Breeding distribution of the Greater Prairie-chicken in the U.S. and southern Canada.

For males, peak lek visitation is in March, April and May. Birds visit the leks in the autumn, but to a lesser extent. For hens, peak lek visitation is in April. Data from one lek (in Wisconsin) showed peak hen visitation on April 18th and peak copulation on April 20th. Robel (KS) observed peak copulation during April 21 – 30th.

Males aggregate on these communal display grounds and establish individual territories. The best territories are in the center of the lek and held by the dominant males. Less-dominant males will be restricted to the periphery of the lek. Most hens visiting the lek mate with dominant males that occupy central territories. Thus, one or two males perform as much as 90% of the matings on one lek.

Display: During the lek display, the male erects the pinnae above his head, inflates the air sacs, lowers his wings, rapidly stamps his feet, and calls (booms). In addition to booming, a series of crows, caws, and cackles can be heard from males throughout the display ground. Short vertical flights called “flutter-jumps” often occur in conjunction with booming. When in presence of a female, the male may perform a nuptial bow with wings spread, pinnae erect, bill lowered to the ground.

Research on Konza has shown that male Prairie-chicken mating success is correlated with aggressive behavior. The more aggressive a male bird is, the higher his chances of mating. Dominant birds may also be young; age doesn't seem to matter. The physical characteristics of the male (pinnae length, esophageal sac color or size, eyebrow color or size) also don't seem to matter. Nor does the physical appearance of the male's lek territory. The aggressive behavior of the male is attributed to a high level of testosterone, however there is a trade-off as high testosterone is also correlated with a lower immune response leading to a higher chance of death due to disease. At a certain level of testosterone, the benefit of more aggressive behavior and greater mating success is overshadowed by a less-effective immune system.

The hen might visit two or three different leks before she finally mates. After mating, the hen selects a nest site usually within .5 mile of the lek. Most nests (75%) occur within 1 mile of a lek.

Lek fidelity: Most territorial males (“regulars”) that attend a given lek return day after day. Additionally, individual males tend to display on the same lek, or at least in the same general area, in subsequent years. About 82% of the males on a booming ground return from one year to the next, suggesting a high degree of site fidelity of males to a lek. Although females may develop a temporary “attachment” to a given lek and even to a particular male on the lek, they may visit other leks after a nest is destroyed and they begin reneating. Females also may develop an attachment to a particular area where they have successfully nested in the past.

Nesting sites: Successful nests are in vegetative cover thick enough to impede the vision of potential predators. Prairie-chickens prefer thick nesting cover close to the lek, but data shows hens moving as far as 500 yds – 1.5 miles from the lek to their nesting sites. Hens begin nesting about the third week in April. Because of this early nesting time, vegetation must be tall and dense and left over from the previous year's growth. Areas that have been recently burned or heavily grazed will not support successful Prairie-chicken nests.

Nests: About four days after the first copulation, hens begin laying one egg per day until reaching a clutch size of about 12. The incubation period ranges from 23-25 days. If nests are destroyed, hens may reneat at least twice, but the clutch size will decrease in nests that are

established later in the summer. Egg hatching success is very high (73-93%), but nest success is lower (22 – 65%) – due to egg predation or nest destruction. On Konza Prairie, <10% of Prairie-chicken nests successfully hatched chicks. Studies have found highest success for nests within dense vegetation and in areas of low predator density. Only hens are involved in nesting and incubation. Eggs are olive with dark brown spots. Chicks are precocial (able to walk and catch their own food very soon after hatching) and will take their first flight at 1-2 weeks of age. Chick mortality is the greatest 1-10 days after hatching especially due to exposure (downy chick feathers don't provide the protection that mature plumage will). The brood usually remains with the hen for 8 to 10 weeks. During that period broods often intermix with juveniles dispersing after about 10 weeks.

Predators: Humans have modified the landscape so that Prairie-chickens may have become more vulnerable to certain predators and numbers of certain predators may have increased. For example, trees along roads and drainage ditches, tree plantings in grasslands, and electrical power poles provide perching sites from which raptors can hunt. In the eastern portion of the Prairie-chicken range, there is more woody vegetation along the prairie/forest transition zone. This woody vegetation is increasing due to wet cycles and the human control of prairie fires, which were a significant limiting factor of woody plant encroachment into the prairie before settlement. Females are most susceptible to predation during the nesting periods which results in the loss of both the hen and her potential production. Red foxes and skunks have been the most common mammalian predators of Prairie-chicken nests throughout most of the eastern range. In the western portions of the birds' range, coyotes replace the red fox as one of the primary predators of the hen and the chicks. In Kansas, it was noted that coyote densities increased over 13x from the 1960's to the 2000's.

Mortality and Competition: GPCs have a short life expectancy, with about 50-60% mortality each year. Mortality of adults results from predators including coyotes, bobcats, raccoons, foxes, hawks, and owls. In addition, birds may be killed through collisions with fences and power lines. Chicks in broods are taken by the same predators, but may also be depleted by exposure (inclement weather - rain, hail, sleet), crows, and smaller predators such as snakes and rats. Hay harvesting before the chicks can fly can also cause significant mortality.

Nests are destroyed by a variety of predators, including coyotes, raccoons, opossums, skunks, snakes, and rodents. Although cattle or other large grazing animals may trample nests, this is unusual under normal grazing management or patch burning/grazing. However, in the case of rotational grazing (e.g. cell grazing, management intensive grazing), intensive early stocking (IES), or triple stocking, nest damage may increase. Harvesting or cultivating during late April, May, or June will destroy nests in hay or cultivated fields.

Wind Power and Prairie-chickens: KSU Researcher Brett Sandercock conducted a 7-year study researching the effects of wind turbines on several different aspects of Prairie-chicken behavior and survival (lek attendance, mating behavior, use of breeding habitat, # eggs produced, dispersal of juveniles, survival rates, and population numbers).

Once the turbines were constructed the researchers found that the hens avoided the areas near the turbines both for breeding (abandonment of established leks) and for nesting (moving nesting areas away from turbines). The question then became: does avoidance of the turbine areas affect the performance (production of healthy chicks) of the birds? The data indicates that the productivity of the Greater Prairie-chicken was not strongly affected even though the hens avoided the turbine area. The results are somewhat surprising, especially

because similar studies have shown that oil and gas development affect prairie chickens.

With wind power development, the researchers had the unexpected result of female survival rates increasing after wind turbines were installed, potentially because wind turbines may keep predators away from nest sites. Female mortality rates are highest during the breeding season because females are more focused on protecting clutches than avoiding predators. "What's quite typical for these birds is most of the demographic losses are driven by predation. We can say that with confidence," Sandercock said. "What's a little unclear from our results is whether that increase in female survivorship was due to the effects of wind turbines on predators."

Primary Threats: The major threats to Greater Prairie-chicken populations are the loss, fragmentation, and degradation of habitat on both private and public lands which occur through the following:

- Inappropriate timing and intensity of livestock grazing
- Conversion of native prairie for development and crop production
- Construction of roads, utility corridors, fences, towers, turbines, and energy developments
- Introduction and expansion of noxious weeds
- Alteration of fire regimes
- Planting of trees

Populations are particularly vulnerable to changing land use practices that degrade or eliminate nesting and brood-rearing habitats. In addition, small, localized populations that are isolated from core areas may face greater risk of extinction due to a lack of connectivity.

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