

# Habitat Evaluation Guide for the Lesser Prairie-Chicken



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# Habitat Evaluation Guide for the Lesser Prairie-Chicken

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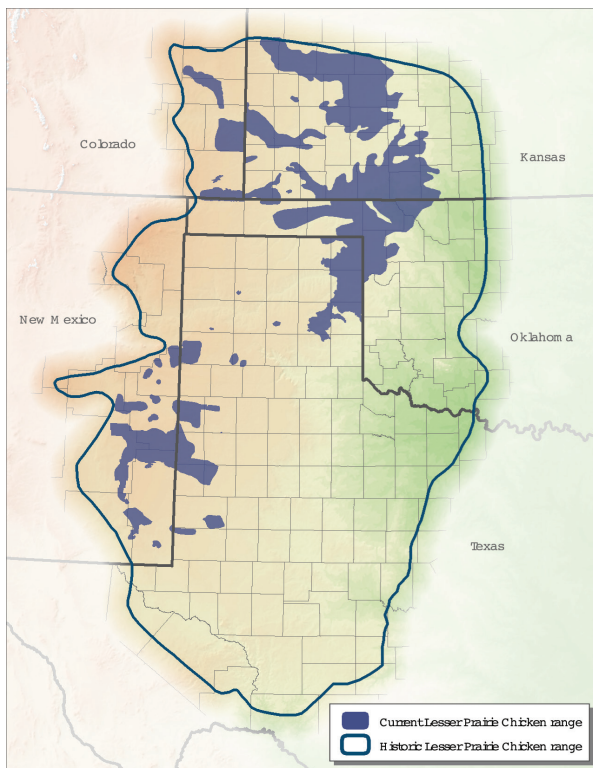
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## Introduction

Oklahoma is home to two species of prairie-chickens: the greater prairie-chicken (*Tympanuchus cupido*) and the lesser prairie-chicken (*Tympanuchus pallidicinctus*). Prairie-chickens are the only two species of grouse found in Oklahoma. The greater prairie-chicken is found in the tallgrass areas of northeastern Oklahoma, while the lesser prairie-chicken is found in the northwestern portion of the state including the panhandle. Lesser prairie-chickens (hereafter LPC) occur in shortgrass and mixed-grass prairies, sand shinnery shrublands and sand sagebrush shrublands (5). Historically, the LPC was common throughout the western third of Oklahoma (5). They depend on large expanses of rangeland (native prairie and shrublands). However, during the last hundred years, most LPC habitat has been lost because of the conversion of rangeland to cropland, woodland, introduced pasture and development (7, 44, 52). As recently as 1963, the distribution of the LPC included 12 northwestern Oklahoma counties (5). Presently,



*Historical and current distribution of the LPC. Populations have become increasingly isolated. (Map developed by Lesser Prairie-chicken Interstate Working Group)*

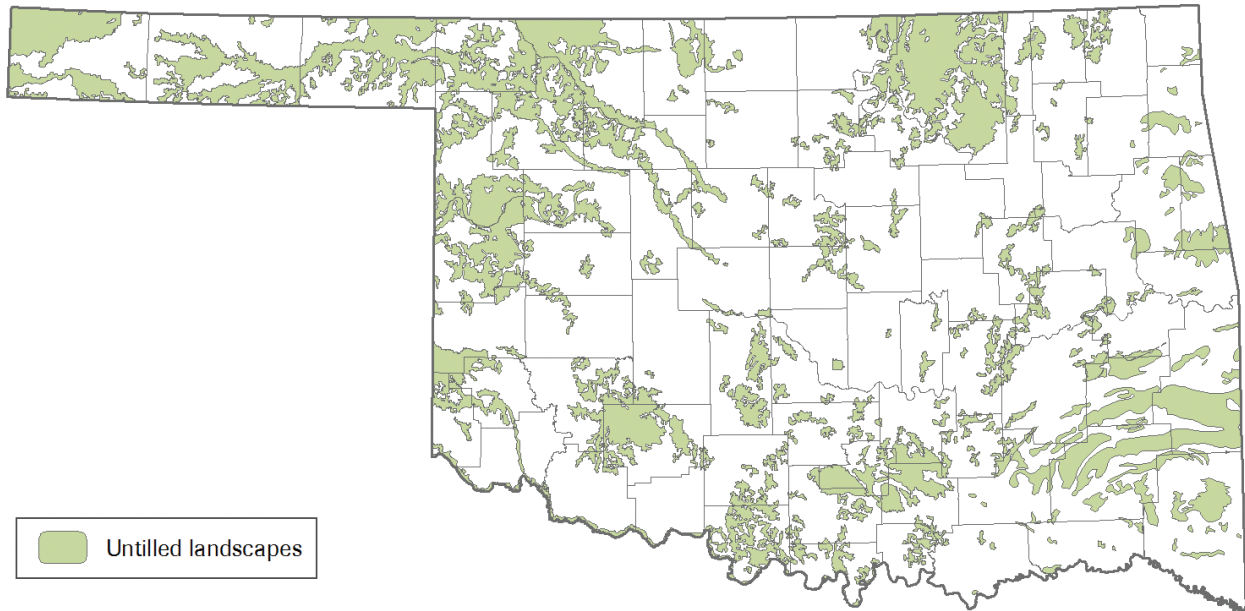
the LPC occurs in Beaver, Ellis, Harper, Texas, Woods and Woodward counties (4, 52). LPCs can occasionally be found in Cimmaron, Roger Mills and Dewey counties. The LPC also occurs in portions of Kansas, Texas, Colorado and New Mexico.

The LPC is classified as a game bird in Oklahoma, although the hunting season has been closed since 1997. Minimum population criteria have been set, that if attained, would make provisions for reopening the hunting season. This could potentially provide financial incentives to landowners. In response to a 1995 petition to list the species as federally threatened under the Endangered Species Act (ESA), the U.S. Fish and Wildlife Service determined it was “warranted, but precluded from listing” (58). The species is reevaluated each year by the USFWS to determine the current status. In 2014, after the USFWS reviewed the species status, it was listed as a threatened species under the ESA. However, a subsequent lawsuit led to a federal judge vacating the listing in 2016. Several large conservation initiatives are in place to help recover the species, including the Lesser Prairie-Chicken Interstate Working Group and the Lesser Prairie-Chicken Range-Wide Conservation Plan (54). Additionally, the NRCS has a Lesser Prairie-Chicken Initiative that provides financial assistance through the Environmental Quality Incentives Program (EQIP). Despite the conservation actions for this species, the LPC is still much reduced from historical numbers and distribution (6, 16, 21, 52).

While direct habitat loss to crops has been a significant factor in LPC decline, remaining populations are threatened by ongoing degradation of rangelands (13). Encroachment by trees, especially eastern redcedar, due to tree planting and fire suppression is the greatest threat to remaining LPC populations in Oklahoma. Other impacts, such as spraying herbicides for shrub or weed (forb) control, energy and human development, fences and improper grazing contribute to the deterioration of LPC habitat (16, 31, 46, 55, 57).

## Life History

Adult lesser prairie-chickens average 15 to 16 inches in length (26). They have a feather pattern of crosswise bars of brown, buff, blackish and white coloration (5). Elongated neck feathers called pinnae, are erected during mating displays of the males. Below the pinnae, the males have



*Few large untilled areas of rangeland remain in Oklahoma. Prairie-chickens persist where large areas of mostly treeless grassland or shrubland occur. (Wayne Ostlie and Chris Hise, The Nature Conservancy, 2005)*

reddish, featherless areas of skin called gular air sacs (these are orange on the greater prairie-chicken), which are inflated during mating displays. In addition to pinnae and air sacs, the LPC has a conspicuous bright yellow comb above each eye (5, 26, 50). Eye combs, like many other secondary sexual characteristics of grouse, are most prominent on males.

As with many other grouse, mating displays of males are conducted on leks. Specifically, LPC leks are called gobbling grounds because of the characteristic sounds males make. Leks are typically located on elevated, open areas where grassland vegetation is short, visibility is good and calls (gobbling) can be heard for a mile or more (4, 9, 52). When available, prairie dog towns, burned areas or cattle feeding points are sometimes used as lek sites. Males concentrate on these communal display grounds to compete for females. The most desirable territories are in the central part of the lek and are usually held by dominant, older males (5, 52). Younger males defend territories toward the edges of the lek or on nearby satellite leks. Most females visiting the gobbling grounds attempt to mate with dominant males that hold central territories. The males advertise their territory by putting on a gobbling display. While this behavior is exhibited mainly in spring, it can occur year-round. Activity increases beginning in February, and the number birds on

the leks peaks the last two weeks of March and first two weeks of April in most years.

During the display, males erect their pinnae, inflate their gular air sacs, raise their eye combs, drop their wings, stamp their feet, raise their tail and make a unique, high-pitched gobble (5, 17, 26, 45). Often, two males will face off and gobble in a fast tempo. Also, short vertical flights called flutterjumps, and cackling are performed between gobbling (26). When in the presence of a female, the male may perform a bow with wings spread, pinnae erect and bill lowered to the ground (5). The hen usually visits two or three different gobbling grounds before she finally mates (5, 51). After mating, the hen selects a nest site to lay and incubate the eggs, usually within a mile of a gobbling ground (8, 15, 35, 39). In Oklahoma, LPC nests are found in upland prairies and shrublands devoid of trees for large distances (5, 52). LPC generally avoid creeks, rivers and steep terrain. Nesting cover is made up of low stature shrubs and dense grass and forbs.

Normal clutch size is 11 to 14 eggs (5, 52). The eggs are grayish-olive, buffy-plain or rarely spotted (2). Nests are simple and consist of only slight excavations in well-drained soils and are lined with grasses and feathers (5, 52). The nests are usually found in some type of vegetation that provides cover. The incubation period ranges from 23 to 28 days, but is typically 25 days (49).

The hen will lead her brood (group of chicks) away from the nest within hours after the last chick has hatched, usually in early morning. Hens then move broods into areas of early plant succession (5, 52). Such areas have abundant tall forbs, an open understory with bare ground and high insect densities. The brood usually remains with the hen for at least 12 weeks, after which the brood disperses or joins other LPC (35). Often, two or more broods will intermix. Juvenile males will often attend established leks in the fall, triggered by changing day length. During winter, LPC will use areas with abundant cover and food-producing plants, such as forbs. They also will use grain crops, if available.

## Habitat Requirements

The combined home ranges of all birds at a lek may be 19 square miles (12,000+ acres) or greater. The average home range of an individual bird is about 4 square miles (15, 39, 53). However,

much larger areas are likely needed to maintain a population of birds in the long term. LPC typically do not make long distance movements, but occasionally they have been demonstrated to disperse up to 44 miles and to even migrate between summer and winter home ranges (10). These movements are important for occasional genetic interchange between populations. For a population to remain viable, a series (or complex) of leks is necessary. Because few landowners control tracts of land that large, cooperative management efforts are necessary for LPC conservation. There is evidence that LPC survival is higher in landscapes with about 30 percent cropland (42), but LPC decline as percent of crop increases (48). Maintaining large areas of treeless native rangeland is most important for LPC management. LPC survival has been shown to be higher in landscapes with 50 to 75 percent grassland (42). Managing for the appropriate vegetation structure (height and density of major grasses, forbs and shrubs) and plant species



*Large landscapes of open rangeland free of tree cover are the cornerstone of lesser prairie-chicken habitat.*



composition is of secondary importance to maintaining large treeless prairie.

While grazing can be used to manage for LPC, insufficient nesting cover from excessive grazing over large areas is detrimental to nesting LPC (52). Invading trees, such as the eastern redcedar, are another threat to the LPC and has been related to its decline (14, 29). In fact, female LPC avoid areas within 300 yards of trees (29). Further, LPC are 40 times more likely to use areas with no trees as opposed to areas with more than 10 trees per acre (29). Fire is an important tool that can be used to prevent woody species from invading rangelands. Fire will also maintain native desirable shrub (such as sand sagebrush and shinnery oak) cover in a desirable structure. Some undesirable species that readily resprout following fire, such as Russian olive, honey locust and mesquite are best controlled with herbicide. However, herbicides should be used sparingly and only on target plants to minimize the impact on broad-leaf herbaceous plants (i.e. forbs) and insects that

LPC require. Large-scale application of broad-leaf selective herbicides is detrimental to LPC. Fire and mechanical tree removal, in conjunction with grazing management and the limited use of herbicides are the best tools to restore rangelands for LPC. To successfully manage for LPCs, no trees should be planted or allowed to persist in fencerows, upland prairies or shrublands. This includes windbreaks. Removing them is beneficial to many species of grassland wildlife including the LPC. Trees located in major drainages are usually compatible with LPC management. A land management plan that maintains rangeland in both early (native annual forbs) and late stages (perennial-native tall grasses, forbs and shrubs) of plant succession is necessary to meet all of the LPC's habitat requirements throughout the year.

### ***Gobbling Grounds (Leks)***

Lesser prairie-chickens prefer to use the same gobbling grounds or leks each year, but often move



*This lek site is on a high ridge that has low and sparse vegetation due to the shallow soil. It provides a good place for LPC males to be seen and heard while watching for potential mates and predators.*

their leks to another site if the vegetation structure is inadequate. Short vegetation is preferred on gobbling grounds. Thus, spot burning followed by spot grazing or mowing on the gobbling ground will usually improve its attractiveness to LPC if the vegetation becomes too tall. In most areas, shallow soil prevents the plant community from becoming too tall, therefore potential lek sites are normally abundant and rarely need to be managed. Prairie dog towns may also be used as gobbling grounds.

### **Nesting Cover and Brood-rearing Cover**

Nesting cover and brood-rearing cover are keys to LPC management because LPC are short-lived and depend on frequent reproduction to persist. LPCs generally select mid- to tall grass or shrub cover for nest sites. Therefore, having some unburned and lightly grazed areas within two miles of leks is recommended for LPC management (33). LPC typically select nest sites

with taller vegetation and more visual obstruction relative to what is available (30, 34). However, nest success has not always been shown to be higher as vegetation height increases. Livestock grazing impacts prairie-chicken cover by changing the amount, kind and pattern of residual grass. Uneven grazing patterns under season- and year-long continuous grazing creates an interspersed pattern of short grass, bare ground and tall, lightly grazed bunches of grass, assuming the livestock stocking rate is appropriate. This structural diversity provides easy travel lanes for broods, abundant access to seeds and insects and escape cover. Brood cover generally is more open at ground level than is preferred nesting cover. Areas with high grazing intensity have been shown to have lower nest success (28). Patch burning and the resulting patch grazing can provide this vegetation structure. Rangelands with light to moderate stocking rates and spot grazing will generally produce more food (seeds and insects) and



*A sand sagebrush plant community that provides excellent LPC nesting cover.*



*An example of a forb rich area in foreground surrounded by sand sagebrush nesting cover. The foreground is dominated by western ragweed, which is an important food plant for LPC and northern bobwhite.*

habitat diversity than either ungrazed or heavily grazed areas. Grazing systems that promote even grazing with little variation in structure and composition (e.g. rapid rotation short duration concentrated grazing) are not conducive to LPC habitat.

### **Food and Escape Cover**

Forbs (commonly called weeds or broadleaf plants) provide seeds that LPC eat. Additionally, many of these forbs support high numbers of insects—the preferred food of LPC when available. Forbs flourish where disturbance (such as grazing or fire) produces bare ground. Insects, seeds and green leafy material are eaten throughout the year, when available (26). Insects are particularly important during the summer months. In winter, LPCs consume seeds and cool-season foliage.

While LPCs will use crops (such as sorghum, corn, wheat and alfalfa), the importance of cultivated food plots can vary between populations

and habitat quality. No single cultivated crop supplies all of the essential nutritional demands that LPC require, however, there are many anecdotal accounts of LPCs flying into grain sorghum fields by the thousands. While crops can be used by LPC, they begin to decline once crops become the dominant land use. Research in Oklahoma has shown that LPC avoided crop fields at every scale examined (51), while research in Kansas found higher survival with moderate levels of crop (42). LPCs will similarly use food plots. However, if food plots are small (10 acres or less in size) or if they are located too far away from cover, they will provide little or no benefit to the LPC. Food plots are no substitute for proper habitat management of native vegetation.

### **Water**

It has long been thought that LPCs do not require free-standing water (52). Similar to other birds, water requirements are met by the



*Forb dominated communities are typically open at ground level which aids in chick movement and foraging, while providing overhead cover from predators and sunlight.*



*Shinnery oak provides cover and hard mast (acorns) for LPC in portions of their distribution including New Mexico, Texas and Oklahoma. The structure of shinnery oak is easily modified as this plant resprouts following fire.*

consumption of succulent vegetation and insects. During periods of drought, water from stock ponds and prairie streams may be used. Recent evidence suggests the use of free-standing water may be more substantial than previously thought and that it can affect space use (19). Hens have been shown to use water sources during the nesting period (19). Whether the provision of water increases survival is unclear. However, drought has significant effects on LPC by affecting food and cover resources. It has been demonstrated that drought negatively affects LPC reproduction (18).

## Causes of Mortality

Lesser prairie-chickens have a short life expectancy, with around 40 to 60 percent mortality each year (20, 25). Mortality of adult LPCs comes from many predators including bobcats, hawks, owls and foxes. Chicks are taken by the same types of predators, but may also be taken by smaller predators such as snakes and raccoons.

Chicks may also be killed during hay harvesting undertaken before the chicks can fly, which is the first couple of weeks after hatching. In addition, LPCs are occasionally killed by collisions with cars, power lines and fences. As land becomes more fragmented with fences, the risk of mortality increases. Hen mortality from fence collisions has been shown to exceed 50 percent in areas with high fragmentation (55). Another study found that under low to moderate fence density, fence collisions and mortality were negligible (41), yet LPC were shown to have higher mortality near fences, which was thought to be related to predation risk (42). Further, increasing pasture size has been shown to be favored by LPC (28). Therefore, the necessity of fence construction and placement should be carefully considered in areas occupied by this species. Avoid creating new fences and attempting to decrease pasture size unless absolutely necessary. Remove unnecessary existing fences. Consider marking fences near leks or where fence strikes have been noted. LPC nests are destroyed by a variety



*Mortality of LPC can be high near fences due to increased predation and collisions. In areas where fences are needed, fence markers may be considered. Old fences no longer needed should be removed. AVOID adding new fences where LPC occur, as they favor larger pastures.*

of nest predators including raccoons, badgers, skunks, snakes and rodents (39). Although nests may be lost to trampling by cattle, this is unusual. Nests in meadows or cropland may be destroyed by harvesting or cultivating during May or June. Therefore, consider limiting haying to mid- to late summer.

## Habitat Fragmentation

There are significant concerns related to habitat fragmentation effects associated with grassland birds' avoidance of vertical structures and human disturbance (34, 36, 37). The life cycles of prairie-chickens require vast areas of relatively unfragmented rangelands. Loss of native prairies has been estimated to be 80 percent (27). Therefore, the effect of each additional fragmentation influence is magnified.

LPCs have been shown to avoid even high-quality rangeland within close proximity to man-

made features. The presence of transmission lines, oil and gas wells, buildings, center-pivots and roads can reduce the use of nesting cover and cause avoidance for LPC hens (34, 23). Lek activity is also disrupted by man-made vertical objects. Oil and gas development has been shown to eliminate use of leks (8). Additionally, nesting and brood rearing are estimated to be impacted up to one mile from man-made structures, such as oil and gas wells (40). However, other research has demonstrated that non-nesting LPC did not avoid houses or oil/gas wells (51). Therefore, avoidance of man-made features may vary, depending on the landscape and the scale. The development of wind power within the distribution of the LPC presents a new threat to the persistence of LPC. If wind turbines cause the same habitat displacement that other man-made structures have been shown to cause, then a wind turbine complex has the potential to negatively impact thousands of acres. Many sites targeted for wind power development in the LPC



*Fragmentation can come from many sources, including wind turbines, roads, fences, trees, oil and gas wells and power lines.*

distribution occur directly in the few remaining untilled landscapes, which harbor surviving populations of the birds. Also, transmission lines are needed to carry the power away from wind power complexes and can likely intersect prairie-chicken habitat several miles from the actual wind development sites and cause additional fragmentation. LPC minimize time spent crossing both roads and power lines (51). While these linear features were not barriers, they did reduce use of the area, which has implications for population connectivity. The key to avoiding fragmentation threats is to ensure proper placement. Human development should be minimized in areas occupied by the LPC. Information on minimizing impacts to the LPC from fragmentation can be found at <http://www.wildlifedepartment.com/lepcdevelopmentplanning.htm> and <http://kars.ku.edu/maps/sgpchat/> (23, 47).

## Habitat Management Tools

### Grazing and Fire

Fire and grazing are the primary vegetation management tools that affect plant composition

and structure on rangeland. The frequency, size and pattern of burning or grazing and their relationship to each other (fire-grazing interaction) must be considered and managed to meet the year-round habitat requirements of the LPC. Most LPCs occur on rangeland typically grazed by cattle or other herbivores. Research has demonstrated that light to moderate stocking rates provide the best long-term economic return and reduced economic risk in times of economic uncertainty or drought. (24). A grazing management plan that maintains the prairie in the middle to late stages of plant succession (native tall grasses, forbs and legumes) interspersed with early stages of plant succession (native annual forbs) is optimal for the LPC. Continuous or season-long grazing at a moderate stocking rate will provide heavily grazed, moderately grazed and lightly/ungrazed patches within a grazing unit because cattle do not graze uniformly.

Rotational grazing systems for cattle have been promoted to mimic historical grazing patterns by large herbivores, such as bison and elk. However, since there were no fences and wild animals moved freely to graze only the highest quality forage, the scale of their rotations was



*Lesser prairie-chickens struggle to survive with new threats on the horizon (Photo by Noppadol Paothong).*

much larger than what most ranchers can allow. Historical accounts and contemporary research demonstrate that grazing animals are attracted to the new growth found either in recently burned or grazed areas and they will stay there indefinitely until higher quality forage is made available (12). One goal of short-duration grazing (sometimes called cell grazing) is to create even grazing distribution and plant use, which reduces spot grazing and makes the plant community more uniform in height. However, if this goal is attained, the structural and compositional diversity of the plant community will decline, reducing the habitat quality for the LPC. Short duration grazing, as it is commonly practiced with multiple paddocks and frequent moves, will not provide the landscape diversity necessary for LPC. Since additional fences are required, LPC survival and habitat use may be reduced. Recent research indicates LPC habitat use is higher as pasture size increases. Specifically, pastures more than 740 acres had higher LPC use (28). Further LPC use decreased as stocking rate increased above 2.5 (AUM) per acre (28). LPC nest survival also was shown to be reduced at even low grazing intensities, due to reduced cover (28). Therefore, light to moderate grazing in large pastures are currently recommended for LPC management.

Prescribed fire is necessary to maintain rangelands. However, the short-term impacts must be carefully considered. Prescribed fire will remove last-year's growth and nesting cover, yet it stimulates forbs necessary for brood cover and reduces plant structure when vegetation becomes too dense for the LPC. Thus, location and size of the burn area in relationship to the unburned area around the lek is extremely important to ensure adequate nesting and brood cover exist each year. An additional benefit of using prescribed fire is control of the eastern redcedar, which does not resprout following a fire. As this plant has the potential to reduce the habitat quality for the LPC due to the tall structure, it is necessary to remove it from upland rangelands. Typically, prescribed fire should be applied at minimum every seven years to prevent redcedar from attaining a height that is undesirable to the LPC and is difficult to remove with fire alone. Sand shinnery and sand sagebrush can be burned periodically to maintain proper shrub height and canopy, as these native shrubs resprout quickly following a disturbance (3). Both of these plants typically return to preburn structure within three years in Oklahoma. Another consideration is the season of burning. Often,

land managers have difficulty applying fire during the late winter or early spring due to low humidity and high winds. Native plants are adapted to both dormant (winter) and growing (summer) season fire. Further, plant community responses to timing (season) of the burn is highly variable, depending on weather (3). Constraining the use of fire to dormant season only is not warranted. Land managers should apply fire throughout the year when conditions are correct to meet objectives. Note: as most nesting of LPC occurs during April to June, managers may want to minimize fire during this period.

Landowners should consider using prescribed fire on 20 to 30 percent of their management unit each year so the entire area is burned within a 3- to 5-year period. This will provide both quality nesting cover and early successional brood cover. Burning more than 50 percent of the area in one year may not provide sufficient cover for nesting and escape from predators. It is very important to retain some unburned areas of dense grass within one mile of the leks. Fire also has potential to alter the structure and composition of the native plant community, depending on the season and scale of the burn and its interaction with grazing animals. The fire-grazing interaction, also known as patch burn grazing, mimics the historical grazing pattern, thus has the potential to create a landscape pattern and habitat structure favorable to the LPC, while also maintaining high forage quality for livestock. Patch burning has been shown to increase plant and animal diversity without negatively affecting livestock production (14). By using fire in this patchwork pattern, cattle rotate themselves around the pasture following the recent fire. This reduces winter protein supplement needs and also allows for stockpiling forage (grass banking) for dormant season grazing and LPC nesting, as well as providing additional forage during drought. Except for actually conducting the burn, no additional labor or structures are required, unlike typical rotational grazing with fences. Additionally, existing cross fences can be removed, which may benefit LPC.

### ***Mechanical Thinning***

As previously noted, eastern redcedar is a serious problem for the LPC due to their avoidance of trees (13, 29). If fire has not been applied to an area for several years, many eastern redcedars may be too large for a fire to effectively remove without using an extreme fire prescription which is difficult to control. Trees greater than 7 feet tall





*Young eastern redcedars like these are easily controlled with fire. However, within seven to 10 years, it becomes difficult to remove without expensive mechanical control or very intense fire.*



*Eastern redcedar is expanding out of shallow soil areas into upland sites due to fire suppression. These upland sites could be occupied by LPCs if the redcedar were removed.*



*Vegetation response six months after a fire in a sand sagebrush plant community. Note the abundant forbs present and the redcedar skeletons.*

become difficult for prescribed fire to remove (1). Also, if the grass fuel load is insufficient due to shallow soils or high stocking rates, the fire intensity may not be great enough to remove the trees. In these cases, it will be necessary to mechanically remove eastern redcedar. The trees may be removed by cutting, pushing, chaining or grinding. If a dozer is used to push the trees over, keep the dozer blade off the ground to minimize soil disturbance. A prescribed fire should be used after the cedar has dried to help remove as much of the woody material as possible. Mechanical thinning may also be needed to remove other tree species such as Siberian elm, Osage orange and cottonwood that have established in upland areas due to fire suppression. Many of these species will resprout and herbicide will be needed to kill the plant. Mechanical removal is much costlier than prescribed fire. However, there are many federal and state programs available to assist landowners. Contact the NRCS, USFWS or ODWC for information.

### **Herbicides**

The use of broadcast herbicides should be minimized to maintain cover and food-producing

plants, such as shrubs and forbs, and the insects associated with these plants. If grazing management (i.e. stocking rate) is appropriate for the productive capabilities of the land and fire is periodically used to direct grazing and balance shrub canopy and height, herbicides will typically only be necessary to control invasive non-native plants. Introduced plants, such as Bermudagrass, Johnsongrass, weeping lovegrass, Siberian elm and Russian olive are of little value to the LPC. Herbicides should be used to eliminate these plant species in rangelands. Some native plants, such as locust and Osage orange can be problematic to control without herbicides. Spot spray or individually treat these problem plants to avoid eliminating desirable plants from the landscape.

### **Cultivation**

Areas with high levels of cropland have been shown to be associated with declines in the LPC over time (13). Limited amounts of croplands within an area may benefit LPCs under certain conditions, particularly when grazing on adjacent rangelands is managed to ensure residual cover. Waste grain in fields can provide winter food. Annual warm-season seed-producing plants, such

as grain sorghum or corn provide a high energy food source that LPCs use during the winter months. Cool-season plants, such as alfalfa and wheat are also commonly used by LPC. However, once cropland exceeds about 35 percent of the total landscape, prairie-chickens will likely decline. Thus, the majority of the available landcover should consist of a native plant community.

## Formerly Cropped Fields

Many Conservation Reserve Program (CRP) lands in Oklahoma have a limited forb component due to the lack of disturbance, high grass seeding rates and lack of forb seeds in the initial seed mix. This is especially true of the earlier CRP contracts. While warm-season crops may provide some benefit to landscapes with grass only CRP, the best alternative is to incorporate native forbs and shrubs (depending on the soil type) into CRP plantings at the time of enrollment and to manage existing CRP land in ways that increase the structural and compositional diversity of the stand. Practices such as prescribed fire, grazing, disking and herbicide thinning of dense grass stands may be needed. Despite the limited quality of some CRP fields for LPC, these areas provide habitat and some CRP fields provide excellent habitat for LPC. Recent research has shown that LPC in Oklahoma strongly select for CRP fields throughout the year (50). Because residual grass is sometimes limiting on native rangelands especially during droughts, LPC populations have benefitted from the residual grass in native CRP (11). However, less than 30 percent of the total acres enrolled in the CRP in Oklahoma were planted to native grass mixtures, and few of those contained forbs and legumes (42). CRP land planted to a single non-native species, such as Old World bluestem or weeping lovegrass, provide limited value to the LPC. Newer CRP fields have much better composition because the program has evolved to provide more environmental benefits beyond just soil stabilization.

Prescribed fire, grazing and disking should be periodically applied to those lands to improve the structure and composition of the plant community. However, disturbance generally only improves stand structure and composition for one to two years. Some very dense stands of grass may benefit from an herbicide thinning to reduce grass dominance and increase forbs. Speak to your local NRCS office if this is an issue. Fire (preferred) or periodic mowing/cutting will be needed to keep

control of redcedar and other tree species, which will render the CRP useless to LPC. Disking can be used to create habitat for LPC broods and for winter food production in existing CRP. Disked areas should be small and distributed in a mosaic throughout the field so that adequate cover is adjacent to forbs. Note: this practice should only be applied on land that has previously been disked or cultivated (e.g. Conservation Reserve Program land or old crop fields). Large-scale disking in native prairie or shrublands should not be practiced (This obviously excludes fire break construction in native rangelands.). Early fall (September/October) disking typically provides a more favorable plant response than does late spring/early summer disking. Interseeding of food-producing forbs may be needed in some CRP fields, although many sites have an adequate seed bank without planting anything. Although an introduced species, adding a small component of alfalfa (0.2 pounds per acre) to CRP lacking native forbs can benefit the LPC (43). Alfalfa not only provides food, but also is a tremendous insect attractant. Despite the limitations of CRP, it can be important for LPC. Priority should be given to maintaining and expanding CRP within the distribution of LPC due to the overall lack of native grasslands and shrublands in these areas.

## Management Summary for the Lesser Prairie-Chicken

1. Remove ALL trees from upland areas including windbreaks. With the exception of major drainages, most of the historic distribution of the LPC was treeless. LPC generally avoid areas with trees. Trees also provide perches for predatory birds and encourage habitat generalists, such as raccoons.
2. Minimize human development such as roads, powerlines, oil/gas wells and other structures within areas occupied by LPC. Specifically, minimize development in critical LPC areas (<http://kars.ku.edu/maps/sgpchat/>).
3. Keep livestock grazing patchy to provide nesting cover (tall grass or shrubs) and brood cover (tall forbs with sparse grass). Proper livestock stocking rate is the method to achieve this. Additionally, periodic fire will maintain a patchy rangeland as livestock follow the fire across the landscape. Do not use grazing systems that promote uniform grazing or heavy use across large areas. The



*A CRP field in Oklahoma planted to Old World Bluestem. Note the lack of diversity in plant composition and structure. LPC do use these stands of Old World Bluestem, but they could be improved by reducing grass cover and increasing forbs to provide more food resources.*



*This CRP field has been invaded by scattered trees. Fire or mechanical control is the key to prevent this problem.*

NRCS can assist with setting appropriate stocking rates.

4. Do not install cross fencing unless absolutely necessary. Use proper stocking rate, water, minerals and fire to achieve patchy grazing distribution rather than new fences. Remove unnecessary fences and mark them near leks and where collisions have been noted. Where fences are necessary, they should be as low as possible, while remaining functional.
5. Minimize the use of herbicides in areas with native forbs and shrubs. Indiscriminate spraying will eliminate many important wildlife plants. In areas with invasive plant problems, spot treat, if possible, or use combinations of fire and grazing, if appropriate.
6. Convert crops to native warm season grasses, forbs and shrubs. Consult the USDA-NRCS Ecological Site Guide (located in NRCS County Offices) to determine the historic plant community composition for the land area of interest.
7. CRP should be managed to include forbs and variable plant structure. Shrubs may be appropriate for some sites. Depending on the site, fire, grazing, haying, disking, herbicide thinning of dense grass or interseeding of forbs and shrubs may be appropriate to achieve the correct plant composition and structure for LPC. Dense stands of grass monocultures should be avoided.

## Conclusion

Oklahoma is fortunate to have LPCs and the rangelands that support them. However, their distribution and numbers have decreased

significantly and continue to decline. To survive and reproduce, the LPC needs large expanses of treeless native rangeland with various stages of plant succession. Populations of LPC can be maintained and increased if native plant communities are restored and maintained with disturbances, such as fire and grazing. Fragmentation is a major concern for this grouse species. Fragmentation from energy development and fences should be minimized. Trees should be restricted to areas where LPCs do not occur. Remaining rangeland should be maintained in native vegetation and marginal cropland should be reseeded to native grass, forbs and legumes when possible.

LPCs are found almost exclusively on private property, thus depend on the stewardship of private property owners. Programs that promote conversion of native prairie to non-native vegetation, such as introduced forages or trees are not beneficial to the LPC. Government and private programs that encourage restoration and management of native prairies and shrublands are available to assist private landowners. Oklahoma and many other central and western states still have large tracts of open rangeland and the opportunity to reclaim and restore millions of acres of native plant communities for the LPC and other prairie species. Adequate funding, public support, competent consultants, energy and industry participation and landowner cooperation are all needed to accomplish this goal. Otherwise, the LPC will be nothing more than a memory for future generations and Oklahoma will have lost an important part of its ecological and cultural heritage forever.

# Lesser Prairie-Chicken Habitat Evaluation Form

Management Unit Name: \_\_\_\_\_

Size of Available Habitat (acres): \_\_\_\_\_

**HABITAT REQUIREMENTS:** Essential habitat components needed for survival and reproduction of LPC. Circle the lowest applicable value for each category. Enter the score from each line on the summary page at the end of this evaluation. Maximum score is 120.

<b>Trees</b>	<b>Value</b>
No trees present in upland areas	10
Up to one tree per acre in upland areas	5
More than one tree per acre in upland areas	STOP*

\*Until this issue is resolved, the remainder of this evaluation is irrelevant.

<b>Nesting Cover – April through June</b>	<b>Value</b>
More than 50 percent of area within 1 mile of leks is comprised of grass or shrub cover less than 15 inches	10
20 to 50 percent of area within 1 mile of leks is comprised of grass or shrub cover more than 15 inches	5
Less than 20 percent of area within 1 mile of leks is comprised of grass or shrub cover more than 15 inches	0

<b>Breeding Season Food Resources – April through September</b>	<b>Value</b>
More than 50 percent of area contains abundant forbs and insects	10
20 to 50 percent of area contains abundant forbs and insects	5
Less than 20 percent of area contains forbs and insects	0

<b>Screening Cover – % of the ground obscured by vegetation above 12 inches (this does not include tree cover)</b>	<b>Value</b>
Canopy cover more than 30 percent above a height of 12 inches	10
Canopy cover 10 to 30 percent above a height of 12 inches	5
Little to no canopy cover above a height of 12 inches	0

<b>Food Accessibility – Below a height of 12 inches (travel corridors)</b>	<b>Value</b>
More than 30 percent open ground below a height of 12 inches	10
10 to 30 percent open ground below a height of 12 inches	5
Little to no open ground below a height of 12 inches	0

<b>Brood Cover Location – May through September (consists of overhead cover, forbs, insects, and open at ground level)</b>	<b>Value</b>
Brood cover less than ¼ mile from nesting cover	10
Brood cover between ¼ and ½ mile from nesting cover	5
No brood cover within ½ mile of nesting cover	0

<b>Winter Food Resources – October through March</b>	<b>Value</b>
More than 50 percent of area contains abundant food plants	10
20 to 50 percent of area contains abundant food plants	5
Less than 20 percent of area contains food plants	0

<b>Winter Protective Cover – October through March (Canopy cover &gt;12 inches but does not include tree cover)</b>	<b>Value</b>
Canopy cover more than 30 percent above a height of 12 inches	10
Canopy cover 10 to 30 percent above a height of 12 inches	5
Little to no canopy cover above a height of 12 inches	0
<b>Fences</b>	<b>Value</b>
Pasture (fenced area) size more than 640 acres	10
Pasture (fenced area) size between 320 and 640 acres	5
Pasture (fenced area) less than 320 acres	0
<b>Roads</b>	<b>Value</b>
No primary roads with heavy vehicle traffic roads within 2 miles of leks	10
Primary roads with heavy vehicle traffic within 1 to 2 miles of leks	5
Primary roads with heavy vehicle traffic less than 1 mile from leks	0
<b>Transmission Lines or Other Structures &gt;35 feet</b>	<b>Value</b>
No structures present within 2 miles of leks	10
Structures present 1 to 2 miles of leks	5
Structures present less than 1 mile from leks	0
<b>Oil and gas wells</b>	<b>Value</b>
No active wells present within 1 mile of leks	10
Active wells present ½ to 1 mile of leks	5
Active wells present less than ½ mile of leks	0

## Summary of Habitat Evaluation

Criteria	Value	Management Recommendations*
Trees	_____	A, F*
Nesting Cover	_____	B, E
Breeding Season Food Resources	_____	A, B, C, E
Screening Cover	_____	B, E
Food Accessibility	_____	A, B, C, E
Brood Cover Location	_____	A, B, C, E
Winter Food Resources	_____	A, B, C, E
Winter Protective Cover	_____	B, E
Fences	_____	D
Roads	_____	none
Transmission Lines/Tall Structures	_____	none
Oil and Gas Wells	_____	none

\* Apply management recommendations if the rating value is less than 10 for any category. See next page for management practices descriptions corresponding to the letters listed in this table.

## Habitat Management Practices

- a. **Prescribed Fire:** This practice is used to increase forbs for food resources. Also, it reduces grass litter to enhance movement of birds through grasslands. Fire can reduce woody plant encroachment, such as eastern redcedar to prevent grasslands from being converted into woodland or forest.
- b. **Prescribed Grazing:** By adjusting the stocking rate (either higher or lower), livestock can be used to manage the structure and the composition of grasslands. Areas with dense grass and little forbs could be grazed more intensively (i.e. higher stocking rate) to decrease grass cover. Areas with little nesting cover would benefit from lower stocking rates to ensure residual grass cover during the spring nesting season. Finally, stocking rates should be conservative enough to ensure adequate grass fuel exists to conduct prescribed fires for control of eastern redcedar. Grazing systems that ensure uniformity of grass structure are detrimental to LPC, as they require various vegetation structures throughout the year. On broad landscapes, grazing intensity should be light and pasture size large.
- c. **Strip Disking:** Disking promotes forbs that can provide food requirements. Disked areas should be small and distributed throughout grasslands, so adequate cover is adjacent to the native food plants. NOTE: This practice is only recommended for previously cultivated land (e.g. Conservation Reserve Program land or old crop fields). Native rangeland that has never been broken should not be disked (except for fire breaks) because this changes the soil structure of these sites and risks invasive plants not already present.
- d. **Remove Fences/Mark Fences:** Fences are related to increased mortality of LPC and LPC favor larger pastures. Fences no longer needed should be removed. Fences needed near leks or have been noted to cause collisions can be marked.
- e. **Establish Native Plant Community:** Marginal crop fields can be converted to native plant communities to increase the amount of habitat for the lesser prairie-chicken. Lists of plants adapted to the site can be obtained from USDA-NRCS. Introduced pastures, such as Bermudagrass and weeping lovegrass should also be converted to native grass when possible. However, these invasive exotics must be fully eradicated with several applications of herbicide prior to native plant establishment. Old World Bluestem should be managed to increase forbs and decrease dense cover. If less than 50 percent of the landscape is grassland or shrubland, conversion to a native plant community should be a high priority for LPC.
- f. **Remove Trees:** Tall vertical structures, such as trees, are strongly avoided by LPC. One of the simplest management actions to increase habitat for prairie-chickens is the removal of trees from upland prairies. Eastern redcedar, Siberian elm, Osage orange and black locust are common woody plants that invade LPC habitat. Eastern redcedar is easily controlled with prescribed fire, as long as the trees are of small stature (less than 7 feet tall). For large trees, mechanical thinning is often necessary. Locust, Osage orange and Siberian elm resprout. Herbicide is the most effective control for these species. Remove skeletons of trees once they are killed.



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