CHAPTER TEN

Public and Private Land Conservation Dichotomy*

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Abstract. Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*) occur primarily on private lands (~94%) within portions of Colorado, Kansas, New Mexico, Oklahoma, and Texas. The current estimated occupied range of the Lesser Prairie-Chicken is 80,030 km^2, with ~5,000 km^2 in public ownership. Alternative management objectives, opportunities, and challenges are dependent on patterns of landownership. Public land management is largely driven by policy and subsequent regulations, whereas private land management is mainly influenced by incentive programs, which are impacted by dynamic changes in governmental policies. Some management actions are currently constrained on public lands because of funding priorities. Other land uses, such as energy development, are taking place range-wide irrespective of landownership. The Lesser Prairie-Chicken may be listed as threatened under the Endangered Species Act, which would likely impact management activities on private and public lands, including managed grazing, prescribed fire, energy development, and recreation. Public lands can contribute to conservation goals, but it is the influence of future policy, regulations, and conservation programs on private lands that will determine the future of Lesser Prairie-Chickens in the Southern Great Plains.

Key Words: Conservation Reserve Program, Endangered Species Act, Lesser Prairie-Chicken Conservation Initiative, National Grasslands, National Resources Conservation Service, U.S. Forest Service.

Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*) have specific habitat requirements for various life history stages that are unique to the species as a sensitive grassland bird. Habitat requirements do not vary with respect to political boundaries or patterns of landownership. Lesser Prairie-Chickens currently occupy portions of Colorado, Kansas, New Mexico, Oklahoma, and Texas. However, habitat suitability does differ with respect to ownership because of varying land management objectives and constraints throughout the occupied range of the species. We address the primary differences between public and private lands in regard to impacts, habitat management, and conservation opportunities relative to Lesser Prairie-Chickens. We begin by outlining the general patterns of landownership within the five-state region where the species occurs and then summarize the main programs that are available for the conservation of Lesser Prairie-Chickens

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within each landownership category. The Lesser Prairie-Chicken was listed as threatened under the Endangered Species Act (ESA) in May 2014, so consideration of the impact of this listing on management actions relevant to the species is warranted (U.S. Fish and Wildlife Service 2014). However, the listing rule was vacated by judicial decision in September 2015, creating considerable regulatory uncertainty at the time of this volume. Further, we discuss management actions that can both directly and indirectly affect Lesser Prairie-Chickens throughout their range. The actions include prescribed fire, grazing management, energy development, and recreation. The goal of our chapter is to develop a framework for conservation that highlights the scale of the issue, while emphasizing the concurrent, but divergent, roles that public and private land management and conservation will play for future conservation and persistence of Lesser Prairie-Chickens.

OWNERSHIP

Private Lands

The total estimated occupied range of the Lesser Prairie-Chicken is currently 80,030 km^2. Of that area, ~75,000 km^2, or an estimated 94% of the range of Lesser Prairie-Chickens are private lands. Range-wide, Lesser Prairie-Chickens occur mainly on private lands and almost exclusively in the states of Kansas, Texas, and Oklahoma. However, habitat quality and the density and distribution of Lesser Prairie-Chickens are highly variable on private lands. Private lands have undergone extensive conversion to row crops, introduced grasses, or become highly fragmented by invasive woody vegetation and anthropogenic structures (Samson et al. 2004). In addition, changes in natural disturbance factors such as fire and grazing have been altered and continue to degrade much of the remaining habitat for Lesser Prairie-Chickens. Many of these same issues, excluding conversion to row crops, threaten available habitat on public lands as well. Some of the concerns for private lands can be addressed through voluntary incentive-based programs. For instance, row crops and introduced grasses can be converted to more suitable vegetation composition and structure, and invading trees can be removed. Existing anthropogenic structures in some cases can be removed or threats mitigated, yet they are typically more permanent than other conditions. Despite a series of issues that potentially affect habitat conditions on private lands, most of the remaining large and relatively stable populations of Lesser Prairie-Chickens occur on private lands.

Federal Lands

National Grasslands are federally owned and managed by the U.S. Forest Service (USFS), an agency of the U.S. Department of Agriculture (USDA). The primary uses of National Grasslands within the current range of Lesser Prairie-Chickens are livestock grazing, energy extraction, and recreation. The Comanche National Grassland located in southeastern Colorado encompasses 1,796 km^2. Yet, much of this National Grassland is short-grass prairie with some canyon country, and therefore, provides marginal habitat for the Lesser Prairie-Chicken. Despite the size of the area, habitat suitability of Comanche National Grassland for Lesser Prairie-Chickens is likely limited. In 2013, only two active leks with ~11 males were found in the Comanche National Grassland (J. Reitz, Colorado Division of Wildlife, pers. comm.).

The Cimarron National Grassland consists of 438 km^2 in extreme southwestern Kansas. Historically, this National Grassland had many active leks, but numbers have fallen precipitously in the past 20 years. As recently as 1995, 14 active leks with an estimated total population of 284 Lesser Prairie-Chickens were present. In 2013, however, only three active leks with ~30 birds occurred at Cimarron National Grassland (A. Chappell, USFS, pers. comm.). Much of the National Grassland is dominated by sand sagebrush (*Artemisia filifolia*) prairie and potentially suitable habitat for Lesser Prairie-Chickens. Lack of nesting cover and brood habitat associated with long-term drought is thought to be a major factor in the decline in Lesser Prairie-Chickens at Cimarron National Grassland (A. Chappell, pers. comm.).

In western Oklahoma and northeast Texas, the McClellan Creek/Black Kettle National Grassland complex occupies 133 km^2. There are no active leks at these National Grasslands and only occasional Lesser Prairie-Chicken use is reported in portions of the area (C. Milner, USFS, pers. comm.). Much of the Black Kettle National Grassland is highly fragmented by tree cover and other land uses and currently offers poor habitat for the Lesser Prairie-Chicken.

Last, the Kiowa/Rita Blanca National Grassland contains 933 km^2 in northeastern New Mexico and the adjacent panhandles of Oklahoma and Texas. These National Grasslands are within the historical range of the Lesser Prairie-Chicken but are not currently occupied. The majority of these grasslands is short-grass prairie and highly fragmented with other landownership, so the potential to support Lesser Prairie-Chickens is limited.

Properties managed by the U.S. Department of the Interior Bureau of Land Management (BLM) are scattered throughout the range of the Lesser Prairie-Chicken, but only New Mexico contains large contiguous areas of BLM land (surface area), with ~3,341 km^2 within the current range of the Lesser Prairie-Chicken (Van Pelt et al. 2013). Much of the BLM lands are suitable habitat dominated by sand shinnery oak (*Quercus havardii*) prairie. Recent estimates (2013) of Lesser Prairie-Chicken leks on BLM land in New Mexico were 91 active leks (M. East, Natural Heritage New Mexico, pers. comm.). Livestock grazing, energy extraction, and recreation are primary uses of BLM land. The BLM has a Resource Management Plan Amendment and a Candidate Conservation Agreement (CCA; see later) for the Lesser Prairie-Chicken on BLM lands in New Mexico.

None of the National Wildlife Refuges (NWR) of the U.S. Fish and Wildlife Service (USFWS) are specifically designated for Lesser Prairie-Chickens, but several refuges occur within the historical range of the species and offer potential habitat. Optima NWR, located in Texas County, Oklahoma, contains 1,753 ha of which a large portion is mixed-grass and sand sagebrush prairie. Muleshoe NWR located in Bailey County, Texas, contains 2,350 ha of which a portion is upland prairie where Lesser Prairie-Chickens have occasionally been reported in the past. Buffalo Lake NWR located in Randall County, Texas, consists of 3,101 ha of which approximately half is grassland. Grulla NWR located in Roosevelt, New Mexico, contains 1,309 ha. The majority of this NWR is a saline lake bed, but Lesser Prairie-Chickens occasionally occur on the upland fringe.

State Lands

In Colorado, state-owned lands with potential to support Lesser Prairie-Chickens are extremely limited. Similarly, Texas has limited state-owned properties important to Lesser Prairie-Chicken. Two Wildlife Management Areas (WMA) operated by Texas Parks and Wildlife Department contain potential habitat for Lesser Prairie-Chickens but are currently unoccupied. Two sites include the Gene Howe WMA (2,382 ha; Hemphill County) and the Matador WMA (11,405 ha; Cottle County). The Matador WMA is within the eastern edge of the depicted historical range of the Lesser Prairie-Chicken but has not contained any leks or birds for decades; however, portions of it do include suitable habitat in the form of sand shinnery oak. About two-thirds of the Gene Howe WMA in northeast Texas are sand sagebrush or mixed-grass prairie. No contemporary observations of Lesser Prairie-Chicken have been recorded at Gene Howe WMA but the site is closer to current occupied range than the Matador WMA. Additionally, Texas Parks and Wildlife Department owns two tracts (99 and 1,214 ha, respectively) in Yoakum County that support Lesser Prairie-Chickens (D. Lucia, USFWS, pers. comm.). The Oklahoma Department of Wildlife Conservation (ODWC) has several large WMAs with the potential to support Lesser Prairie-Chickens. Sites include Beaver River WMA (10,809 ha; Beaver County), Cimarron Hills WMA (1,526 ha; Woods County), Cimarron Bluffs WMA (1,388 ha; Harper County), Ellis County WMA (1,943 ha; Ellis County), and Packsaddle WMA (7,956 ha; Ellis County). Lesser Prairie-Chickens are occasionally seen at Cimarron Bluffs WMA with one active lek but rarely seen at the other WMAs (L. Weimers, ODWC, pers. comm.). Beaver River, Cimarron Hills, and Cimarron Bluffs WMAs are dominated by sand sagebrush prairie; Ellis and Packsaddle WMAs are dominated by sand shinnery oak prairie. Lands under the management of the Oklahoma Commissioners of the Land Office have an additional eight active Lesser Prairie-Chicken leks (A. Gregory, ODWC, pers. comm.). The Kansas Department of Wildlife, Parks, and Tourism (KDWPT) manages the Pratt Sandhills Wildlife Area (2,313 ha: Pratt County) and the Sandsage Bison Range (1,497 ha: Finney County). Limited numbers of Lesser Prairie-Chickens have been utilizing these areas with the last reports of birds during spring lek surveys in 1994 for the Sandsage Bison Range and 1999 for the Pratt Sandhills Wildlife Area (J. Pitman, KDWPT, pers. comm.). New Mexico has 10,963 ha in Lea, Roosevelt, and Chaves counties managed by the New Mexico Department of Game and Fish as

Prairie Chicken Areas (Chapter 13, this volume). Virtually, all of the properties currently have Lesser Prairie-Chickens present with 66 active leks in 2013 (M. East, pers. comm.). Further, New Mexico has ~1,000 km^2 within the range of the Lesser Prairie-Chicken managed by the New Mexico State Lands Office. These properties had 168 active Lesser Prairie-Chicken leks in 2013 (M. East, pers. comm.).

Ownership Summary

The vast majority of Lesser Prairie-Chicken range is in private ownership (estimated at 94%). The management on private lands is the decisive factor for the future of the species and should continue to be the significant focus of any conservation efforts for the Lesser Prairie-Chicken. The total estimated occupied range of the Lesser Prairie-Chicken as estimated from current distribution maps is 80,030 km^2. The total area of public lands described earlier is ~5,000 km^2. The public lands do not constitute all federal and state lands within the current range of the Lesser Prairie-Chicken; however, they do represent the most significant public areas that have potential to support the species. Of course, only portions of these public lands provide appropriate habitat with plant communities that support Lesser Prairie-Chicken, and much of that area would require management investment to become quality habitat. The total area of public lands is a large area, but habitat is highly fragmented in most instances and occurs sporadically across a vast spatial scale. However, some public lands may provide private land conservation opportunity by using them as focus areas to anchor regional landscape conservation programs. Further, public lands can provide demonstration sites for private landowners to observe management efforts aimed at Lesser Prairie-Chicken conservation assuming they are managed appropriately.

CONSERVATION PROGRAMS

Federal

Conservation Reserve Program

The Conservation Reserve Program (CRP) of the U.S. Department of Agriculture (USDA) was initially implemented by the Food Security Act of 1985 (or the 1985 Farm Bill) to place qualified existing cropland on highly erodible soils into perennial vegetation cover to reduce surplus commodity crops, minimize runoff, and prevent erosion for 10- or 15-year contract periods in exchange for an annual rental rate and cost share for vegetation establishment and maintenance (Farm Service Agency 2014). Currently, the CRP and associated initiatives are administered by the Farm Service Agency (FSA), with additional technical support provided by the Natural Resource Conservation Service (NRCS). Beyond the soil and water benefits, CRP lands also provide habitat for many wildlife species including the Lesser Prairie-Chicken.

The CRP is often singled out as one of the more important federal conservation programs because of the sheer scale of the program in terms of area, time on the landscape, and conservation funding. Specifically, CRP has considerable area under contract within the range of the Lesser Prairie-Chicken, with 20,379 km^2 under contract in 2013 (R. Wagner, USDA FSA, pers. comm.). However, the total area has decreased recently as state area capacity and reenrollment have decreased (Figure 10.1). Despite a decreased area, CRP has considerable potential to positively impact Lesser Prairie-Chicken populations by returning marginal cropland to perennial grass cover. Although the quantity of CRP is substantial, the quality of habitat it provides is variable. In some states, Kansas being notable, most CRP was planted in a diverse native mix that closely approximated native grasslands. In Oklahoma and Texas, CRP seed mixtures included exotic grasses such as old world bluestems (*Bothriochloa* spp.) and weeping lovegrass (*Eragrostis curvula*) that form monotypic stands with low species diversity. Introduced plants provide some habitat, but the quality is reduced because plant structure and composition are marginal for Lesser Prairie-Chickens. The CRP is a federal program, but both state and private partners contribute to its design and application. State agencies provide guidance on the establishment of priority areas where CRP should be focused for wildlife conservation. For example, in Kansas, CRP priority areas have been delineated to benefit the conservation of Lesser Prairie-Chickens. Further, both state biologists and private nongovernmental biologists, such as Pheasants Forever, often help deliver CRP and other Farm Bill conservation programs.

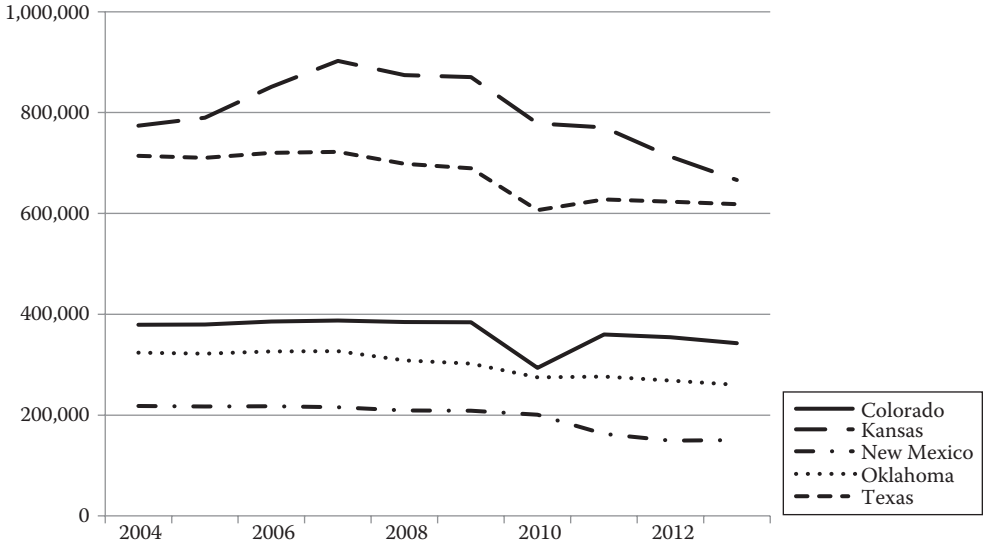

Figure 10.1. Area (ha) of lands enrolled in the Conservation Reserve Program in counties within the range of the Lesser Prairie-Chicken for the five states of Colorado, Kansas, New Mexico, Oklahoma, and Texas, 2004–2013. (Data courtesy of the U.S. Department of Agriculture 2014.)

Starting in 2008, the State Acres for Wildlife Enhancement (SAFE) initiative allows for continuous CRP enrollment as a voluntary program designed to address state and regional high priority wildlife objectives (U.S. Department of Agriculture, Farm Service Agency 2013). Each state with populations of Lesser Prairie-Chickens has opportunities for private landowners to participate in the SAFE initiative. The goal of the Colorado Lesser Prairie-Chicken SAFE project is to restore and enhance 8,705 ha of short- and midgrass sand sagebrush prairie to maintain and enhance populations of Lesser Prairie-Chickens. The goal of the Kansas Lesser Prairie-Chicken Habitat SAFE project is to enroll 21,093 ha in CRP to restore mixed-grass prairies to maintain and enhance populations of Lesser Prairie-Chickens. The goal of the New Mexico Lesser Prairie-Chicken SAFE project is to enroll 1,053 ha in CRP in the eastern part of the state to benefit the Lesser Prairie-Chicken by restoring native grasslands for breeding and brood rearing. The goal of the Oklahoma Mixed Grass Prairie SAFE project is to enroll 6,113 ha in CRP to restore mixed-grass prairie type associations in northwestern Oklahoma to benefit grassland birds. The goal of the Texas Mixed Grass SAFE project is to enroll 49,676 ha in CRP to reconnect geographically and reproductively isolated populations of LPC by creating native mixed-grass prairie and travel corridors.

NRCS Lesser Prairie-Chicken Initiative

The NRCS Lesser Prairie-Chicken Initiative is available to landowners for improving the effectiveness of voluntary conservation practices to expand habitat for Lesser Prairie-Chickens and benefit the long-term sustainability of producers' agricultural operations. The targeted program uses the Environmental Quality Incentives Program and Grassland Reserve Program to improve and protect habitat for the Lesser Prairie-Chicken. Available conservation actions under the initiative include the following: (1) supporting sustainable grazing management that results in residual nesting cover and supports native plant communities; (2) increasing connectivity of existing habitat for Lesser Prairie-Chickens; (3) improving weed and invasive species management; (4) reducing tillage on agricultural fields; (5) protecting, maintaining, and restoring large tracts of native oak/tall-grass or sand sagebrush prairie; (6) maintaining the stability of land use and conservation of shrub-dominated habitats near lek sites; and (7) promoting the use of government programs that provide incentives for the development or restoration of habitat on

private lands. To date, ~4,500 km^2 of mostly private lands have been impacted by this program (NRCS 2013). Enrollments include 36,859 ha in Colorado, 46,082 ha in Kansas, 158,941 ha in New Mexico, 32,123 ha in Oklahoma, and 179,188 ha in Texas (C. Hagen, Oregon State University, pers. comm.). Conservation practices such as woody plant removal, prescribed fire, managed grazing, fence marking, and conservation easements can be used to achieve the program objectives.

Candidate Conservation and Safe Harbor Agreements

Candidate Conservation Agreements are a voluntary conservation agreement between the USFWS and public or private parties to identify threats to candidate species that are proposed for federal listing as threatened or endangered, and develop a plan of action to improve conditions and reduce or remove threats so that listing of the species may not be necessary (Candidate Conservation Agreements, Fact Sheet, USFWS 2011a). A Candidate Conservation Agreement with Assurances (CCAA) creates incentives for nonfederal landowners that are proactive and engage in conservation efforts for candidate species under the ESA. As a result of their efforts, landowners are given assurances from the USFWS that specifically describes what will be expected in the future. More specifically, a CCAA provides participating landowners with a permit containing assurances that if they engage in certain conservation actions for species included in the agreement, landowners will not be required to implement additional conservation measures beyond those in the CCAA even if the candidate species is listed. Each CCAA is considered separately by the USFWS and both the landowner and the USFWS come to agreement on the provisions within the CCAA. Also, additional land, water, or resource use limitations will not be imposed on them should the species become listed in the future, unless they consent to such changes (Candidate Conservation Agreements, Fact Sheet, USFWS 2011b). The primary goal of the agreements is to encourage landowner involvement in conservation activities, while reducing landowner concern about increased regulations if the species was ever to become federally listed. A variety of conservation actions may qualify landowner protection under these agreements, including the following: (1) protecting and enhancing existing populations and habitat; (2) restoring degraded habitat; (3) creating new habitat; (4) augmenting existing populations; (5) restoring historic populations; and (5) not undertaking a specific, potentially affecting/damaging activity. Only private lands are eligible for agreements, and the three states of Texas, New Mexico, and Oklahoma have set up programs for CCAAs. When the Lesser Prairie-Chicken was listed as a threatened species in May 2014 under the ESA, agreements created when the species was still a candidate species under ESA were still operational and have the potential to contribute toward recovery.

Should federal listing of Lesser Prairie-Chickens as a threatened species reoccur, the Safe Harbor program would be the appropriate agreement structure used between the USFWS and landowners or other parties. Safe Harbor is similar to CCAA in that it is a voluntary agreement with the USFWS. Safe Harbor provides assurances from the USFWS to the private party that if the private party fulfills the conditions specified in the agreement, no additional activities will be required (USFWS 2013). When the Lesser Prairie-Chicken was listed no Safe Harbor agreements were developed.

USFWS Partners for Fish and Wildlife

Partners for Fish and Wildlife is a federal aid program administered by the U.S. Fish and Wildlife Service (USFWS). The program provides both technical and financial assistance for qualified practices for wildlife enhancement on private lands. Often, the resources of this program are combined with other federal or state resources to increase conservation benefits for specific projects. The Partners program primarily targets federal trust resources and wildlife species that are in peril such as the Lesser Prairie-Chicken. Practices such as tree removal, prescribed fire, grazing management, and vegetation establishment are the primary practices that have potential to benefit the Lesser Prairie-Chicken under the Partners program. Most often the Partners program is implemented in concert with other state or federal programs. For instance, in Kansas the removal of eastern red-cedar (*Juniperus virginiana*) projects has been expanded to multiple

landownerships and become larger landscape projects by combining the Partners program with other state and NRCS projects.

State

In addition, in the initial listing decision, the USFWS concurrently published a special rule under section 4(d) of the ESA that exempts certain activities from the prohibitions of the Act. One of the provisions in the special 4(d) allows for activities being implemented under the Western Association of Fish and Wildlife Agencies' Lesser Prairie-Chicken Range-wide Conservation Plan (RWP) to be exempt from the ESA. The rule essentially enabled states to provide viable options for industry and landowners for the management of Lesser Prairie-Chickens. The conservation plan has multifaceted management purposes: it identifies range-wide and subpopulation goals, identifies habitat amounts and conditions to achieve goals, defines focal areas and connectivity zones, relies on voluntary landowner incentive programs for habitat management, promotes minimization of impacts or mitigation when necessary, establishes a mitigation framework and funding source, identifies needed research and monitoring, develops an adaptive management framework for new research or monitoring to change management options if necessary, and addresses stakeholder input (Van Pelt et al. 2013). Overall, the plan allows for continued economic development within a voluntary framework and compliance opportunities within the federal listing under the Endangered Species Act. The plan prioritizes funding into 25% permanent conservation and 75% for short-term management contracts. Landowners may receive up to 125% of actual cost for implementing conservation actions (Van Pelt et al. 2013). The approach to a federal listing is an unprecedented process with cooperation from federal agencies, state wildlife agencies, private industry, and private landowners.

State wildlife agencies have historically led conservation efforts on both public and private lands for the Lesser Prairie-Chicken. The initial listing of the Lesser Prairie-Chicken under the ESA with a 4(d) provision allowed the states to continue to manage conservation efforts (USFWS 2014). Some examples of state programs available to private landowners include the following: Habitat Improvement Program (Colorado), Wildlife Habitat Protection Program (Colorado), Wildlife Habitat Improvement Program (Oklahoma), Landowner Incentive Program (Texas), and Wildlife Habitat Improvement Program (Kansas). States also have State Wildlife Grants (SWG), which is funding granted to the state from the USFWS that may be targeted for conservation on private lands. For example, Kansas has historically had a priority area within their SWG grant proposals to provide additional assistance to private landowners within the range of Lesser Prairie-Chickens. In addition to providing unique state level programs, state wildlife agencies are integral in administering many of the federal programs. For example, most states have Farm Bill Coordinators who provide technical assistance to the implementation of USDA conservation programs, especially for wildlife resources. Efforts by these coordinators in recent years to increase priority of Lesser Prairie-Chickens have been integral to targeting species conservation efforts. Another example is in Kansas where biological technical assistance has been provided to NRCS programs by state-agency area biologists since 1994 through a contractual agreement between the NRCS and KDWPT. In addition to technical assistance, most states provide financial resources for partnership positions for biologists from Pheasants Forever as a nongovernmental organization that assists with the implementation of USDA conservation programs. Often it is by the unsung "behind the scenes" efforts and local contacts of state biologists that state and federal conservation programs are applied to private land one parcel at a time.

Private

Conservation Banking

Conservation banks can serve as powerful tool for conserving imperiled species on private lands. Banks are permanently protected lands that provide habitat for a target species or resource. The purpose is to offset actions carried out at one site, by protecting and enhancing another site. Conservation banks for threatened and endangered species typically involve a landowner, a developer, a third party to manage the bank, and the USFWS. When a developer must carry out some action that is expected to have negative effects on a sensitive species, they may purchase

"credits" from a conservation bank (Conservation Banking, Fact Sheet, USFWS 2012). The USFWS approves what a credit consists of, such as number of acres, but the market determines the price of an individual credit.

The owner of the conservation bank has an incentive to manage for the imperiled species because of the value that the market has placed on that species through the sale of these credits. The USFWS requires that conservation banks have an agreement with the USFWS, grant a conservation easement that restricts certain land uses and development that could be detrimental to the target species, develop a management plan for the conservation bank, and provide funding for the management (Conservation Banking, Fact Sheet, USFWS 2012). A third party, such as a land trust or nonprofit organization, will hold the easement for the conservation bank and ensures that the easement and management actions are carried out. Once these steps are in place, the landowner with the conservation bank can sell a certain number of credits to a developer that should offset impacts. Conservation banks can be an effective method to create incentives for private landowners to conserve imperiled species while allowing development in an area.

Multiple Use vs. Single Purpose Management

Approaches and development of conservation programs differ between private and public lands because of economics, legal authorities, and existing policies. Further, the strength and the direction of the relationship between demands and realized management may differ markedly between public and private lands. However, because the Lesser Prairie-Chicken was a valued game species prior to being listed as a threatened species, both private landowners and state and federal agencies have an additional incentive to prioritize management for the species. Management for Lesser Prairie-Chickens can be compatible with other land uses, but populations cannot be maximized without affecting other land outputs. Therefore, it becomes an issue of trade-offs that managers must decide within the bounds of regulatory policy what uses, products, and services a tract of land will produce. Prioritizing among multiple uses is a paradoxical challenge for managers of public and private lands when the population status of many species, including Lesser Prairie-Chickens, are influenced by external factors beyond their control such as management practices on adjacent lands, effective scale of management, and climatic influences.

At the outset, most private landowners might appear to manage for a single focus—maximization of profit. Yet, this is seldom the case, as many private landowners have multiple objectives and are not driven solely by economic demands (Torell and Bailey 2000). Private landowners have many of the same demands and objectives as public land managers: economics, laws and regulations, stakeholder demands, and personal objectives.

Most public lands are managed for multiple objectives of which conservation of Lesser Prairie-Chicken is a single goal. For example, on National Grasslands, the USFS must comply with the Multiple-Use and Sustained Yield Act of 1960. Many of the competing objectives are compatible, but they are not likely mutually inclusive. For example, species occurring together have various, although sometimes similar habitat requirements. Therefore, it is impossible to simultaneously maximize all potential biotic populations on a given area. Hence, management on public land often attempts to optimize, rather than maximize, multiple species or multiple objectives. The approach may work well when all species have similar value to society, but when one species has more societal value than another, single focus management may be favored.

Summary of Conservation Programs

The available programs that we have described for the conservation of Lesser Prairie-Chickens is not exhaustive, but we have summarized the most relevant programs due to their scale of implementation. What should be evident is that private landowners have an array of available programs to assist with the conservation of Lesser Prairie-Chickens. The availability of alternative conservation programs is not a trivial issue because ~94% of the range of Lesser Prairie-Chickens is in private ownership. It is clear that future conservation will require landowner participation, and continued funding and potentially expansion of incentive-based programs such as those listed here will be critical. It cannot be overemphasized that conservation efforts on private lands often hinge on incentive programs, and this paradigm distinguishes private land conservation from public land conservation. On public land, policy directly guides conservation actions. On private

lands, policy indirectly guides conservation action through incentive programs. The contrast between conservation plans is particularly evident with cost-share programs that target certain management practices and actions.

ENDANGERED SPECIES ACT

Should the federal listing of the Lesser Prairie-Chicken as a threatened species under the Endangered Species Act in May 2014 be reinstated, it will have direct and indirect effects on both private and public land management. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Within take, "harm" is a broad term that includes habitat modification and degradation if it "kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." As defined under the federal legislation, harm can include habitat modification demonstrated to cause loss of a listed species.

Limited data indicate that anthropogenic structures, such as the infrastructure associated with energy development, can negatively impact Lesser Prairie-Chickens (Hagen et al. 2011). Thus, the ESA listing may influence energy production. Under certain circumstances, the conversion of native grassland or prairie may also constitute take. Take of Lesser Prairie-Chickens as a threatened species could require mitigation for actions on private lands where native grassland is proposed for conversion to cropland. On private lands, livestock grazing and other normal agricultural operations such as existing croplands will not be impacted by the listing decision. In addition, the development of compatible grazing practices may change within USDA or other federal programs to further benefit the Lesser Prairie-Chicken.

Federal protection of the Lesser Prairie-Chicken under the ESA will potentially provide opportunities for conservation by more landowners on private lands than any previous species listing within the Southern Great Plains. Opportunities arise because Lesser Prairie-Chickens are considered a resident game bird, occurs across five states, and its habitat overwhelmingly occurs on private lands. Species persistence will depend on management at the landowner level across landscape scales. Conservation practices are primarily undertaken by private landowners within incentive-based programs, but the ESA listing may create misunderstanding and fear, which may initially limit landowners from taking advantage of the variety of opportunities to work toward conserving the listed species (Brook et al. 2003). A listing decision can direct federal resources toward areas where a listed species occurs and raise awareness of species status (Morrow et al. 2004), but landowner acceptance may not be adequate to make significant recovery because of fears of regulation in the short term. In the case of the federally endangered Attwater's Prairie-Chicken (*Tympanuchus cupido attwateri*), concerns about increased regulation and oversight of federal actions proved to be short-lived and conflicts were local (Morrow et al. 2004). Engagement of landowners in advance of a listing decision through the conservation agreement process and working within approved federal programs to provide predictability inside NRCS and other conservation plans may help to reduce negative reactions by landowners. Further, financial incentives to private landowners through mitigation or conservation banking may also alleviate negative perceptions. Recognizing cultural and social issues that are obstacles for conservation progress will be just as important as sound habitat management, while accepting that federal listing is another tool available for species recovery.

MANAGEMENT AND USES

We have categorized the distribution of Lesser Prairie-Chickens into public and private lands with different approaches to conservation, but several management issues apply to all lands without regard to landowner category. The three most common conservation practices shared among private and public lands management are applications of prescribed fire, control of trees and shrubs, and livestock grazing. In addition, anthropogenic impacts such as infrastructure and energy development are shared among all lands.

Prescribed Fire and Brush Management

Large-scale changes in tree cover are a primary factor associated with the loss of Lesser Prairie-Chickens in the eastern portion of the species range (Fuhlendorf et al. 2002). At local scales

of home ranges or nest sites, no direct evidence has indicated how fire impacts Lesser Prairie-Chickens. However, because fire both directly and indirectly changes the structure and composition of vegetation, it is plausible that prescribed fire could be used to improve vegetation conditions for different life stages of Lesser Prairie-Chickens. Changes might be short-lived because the plant communities are fire adapted and rapidly return to preburn conditions with the exception of tree cover encroachment (Boyd and Bidwell 2001). Many land managers are reluctant or unable to use prescribed fire to manipulate woody plants. Often mechanical removal or chemical treatments are utilized as surrogates for prescribed fire. Removal and herbicides do not have the same ecological benefits as fire but can be used to reduce woody plant structure and composition and change the herbaceous composition. At a broad spatial scale, mechanical or chemical tree removal should have similar impacts as fire for Lesser Prairie-Chickens if treatments prevent conversion of grassland and shrubland plant communities to woodlands. Shrub management through various forms of disturbance may have both positive and negative impacts on Lesser Prairie-Chickens depending on the scale, but eradication of shrub communities for Lesser Prairie-Chicken management is not supported in the literature, especially in western portions of their range (Bell et al. 2010, Thacker et al. 2012, Pirius et al. 2013). However, eradication of tree and invasive woody plant cover does have support in the literature (Fuhlendorf et al. 2002).

Woody plant management is often implemented on private lands through various state and federal cost-share programs as a method of ecological restoration for the Lesser Prairie-Chicken (Figure 10.2). The programs are largely based on anecdotal and empirical evidence that Lesser Prairie-Chickens avoid areas with tree cover (Fuhlendorf et al. 2002). Landowners are often willing to remove woody cover to benefit cattle production and meet other land objectives; therefore, these cost-share programs are generally popular and will likely continue into the future.

However, management for natural disturbance on public lands is less likely, particularly regarding applications of prescribed fire on federal lands. Challenges arise due to the difficulty in federal agencies acquiring adequate resources and training to conduct prescribed fires. For example, most fire resources within the U.S. Forest Service are spent on wildfire suppression

Figure 10.2. Encroachment of trees and woody plants is a major factor in loss of habitat in some areas of the range of Lesser Prairie-Chickens. Prescribed fire is often used on private and state-owned lands to control woody plants such as the eastern red-cedar. (Photo courtesy of R. Dwayne Elmore, Oklahoma State University.)

and preparedness, leaving few resources for prescribed fire. For instance from 2002 to 2012, only 17% of wildlife protection funding on federal lands was allocated to fuels reduction versus 32% on suppression and another 32% on preparedness (Gorte 2011). Fuels reduction includes many practices of which prescribed fire is one option. Models point to future climatic conditions that favor increased wild fire frequency and intensity in the southwestern United States (The Nature Conservancy 2013), and this scenario is unlikely to change in the immediate future. Therefore, most fire on public lands will likely be in the form of unplanned wildfires that are typically large in area and intense in nature. Unplanned fires may help to minimize encroachment by invasive woody plants or trees (at least non-sprouting species such as eastern red-cedar), but may not meet annual management needs for brood habitat in some of the more productive rangelands. State agencies can implement prescribed fire at a lower cost in terms of manpower than federal agencies and may be more likely to conduct prescribed fires. For instance, the Oklahoma Department of Wildlife Conservation actively carries out prescribed fires on Wildlife Management Areas that support Lesser Prairie-Chickens or have the potential to support the species. Due to policy restrictions, mechanical and chemical control will likely be used rather than prescribed fire on public lands for the foreseeable future. Treatment can be effective at preventing woodland conversion, but costs are generally higher which limits the scale of application. Despite constraints for federal agencies, there are guidelines in place regarding fire and the Lesser Prairie-Chicken. The USFS Comanche and Cimarron National Grasslands use prescribed fire to "treat" Lesser Prairie-Chicken habitat in a way that provides a mosaic of vegetation types. The goal is not to "blacken" an area; rather, the goal will be to treat an area by allowing for a mosaic burn pattern. Within 3–5 years, the National Grasslands will develop a Lesser Prairie-Chicken habitat assessment that utilizes prescribed fire to improve habitat. A burn plan, describing the prescribed use of fire within a specific and well-defined area, should be completed by an interdisciplinary team prior to implementation. The plan should include the current status of habitat and how the burn will move vegetation toward quality habitat as described under the Lesser Prairie-Chicken Habitat Requirements. Annual assessments will also be conducted on previously conducted prescribed burns to determine how effective they were in providing appropriate vegetation as described under the Habitat Requirements (USFS 2014).

In summary, fire or other significant ecological disturbance are necessary at periodic intervals to maintain productivity and vegetation composition of grasslands and shrublands as well as to prevent tree encroachment over much of the extant range of Lesser Prairie-Chickens. Disturbance can also be used to temporally modify vegetation composition and cover to meet requirements of various life stages of Lesser Prairie-Chickens. Tree removal is a desirable practice for many landowners, and various state and federal programs can provide cost sharing for implementation, and management of woody plants will likely continue and potentially expand on private lands. State-owned lands likewise have the potential to continue using disturbance to manage plant communities. Due to restrictive administrative requirements and a lack of resources, federal lands are less likely to use prescribed fire at any relevant scale and more likely to use mechanical or chemical methods at limited spatial scales due to costs.

Livestock Grazing

On native grasslands throughout the range of the Lesser Prairie-Chicken, grazing for livestock production is a primary land use. Livestock production in native rangelands is one reason that existing habitat still remains for the Lesser Prairie-Chicken, albeit the quality of this habitat is not optimal for much of this area. Patterns of livestock grazing show considerable regional variation throughout the range of the Lesser Prairie-Chicken. Many public lands are grazed to provide multiple uses or achieve various management objectives. State wildlife agencies manage many Wildlife Management Areas by setting relatively conservative stocking rates of livestock to provide residual cover for wildlife including Lesser Prairie-Chickens. During droughts, public and private land managers will reduce stocking rates or may not stock livestock at all. Stocking rates are highly variable across each property. BLM land managers implement grazing in a manner to meet the standards of Public Land Health (BLM 2008). Further, grazing management is

indicated as a management tool when vegetation becomes "decadent" (BLM 2008). Each allotment has a grazing plan that details stocking rate, season of use, grazing system, and any management needed. Changes are put into place under new grazing plans if monitoring data on plants and soil conditions indicate that changes are needed (BLM 2008). The Cimarron and Comanche National Grasslands grazing management plans consider stocking rates, rotation patterns, grazing intensity and duration, and contingency plans for prolonged drought for allotments where Lesser Prairie-Chickens are one management goal (USFS 2014). Escape ramps are also used to limit drowning of birds in stock water tanks. Additionally, the Cimarron and Comanche National Grasslands follow the grazing guidelines of Van Pelt et al. (2013) (33% utilization of annual production) for grazing management for the Lesser Prairie-Chicken.

One might assume that public lands would be more lightly stocked than private lands, but this is not necessarily true. The large variation in annual precipitation within the region makes overstocking likely unless producers conservatively stock grasslands each year. Recommendations for highly arid lands are not >35% utilization of annual forage production (Holecheck et al. 1999). During drought years, many grasslands are overstocked except ungrazed sites without livestock such as CRP lands. Areas that have drought management plans requiring destocking may avoid this issue if the plan is followed. Limited areas that are overstocked for short periods are not likely to be of negative consequence to populations of Lesser Prairie-Chicken. Creation of brood habitat by heavy grazing and subsequent annual forb production is a notable example. However, as the spatial scale of land management becomes larger, landscape changes will impact Lesser Prairie-Chickens (Fuhlendorf et al. 2002). The majority of federal, state, and private grasslands are grazed annually, and stocking rate and duration of grazing have the potential to impact Lesser Prairie-Chickens range-wide regardless of landownership. Lands enrolled in the Conservation Reserve Program (CRP) are a special case because they are only managed periodically with mid-contract management under the terms of the CRP contract. During severe drought, emergency haying and grazing has been allowed in CRP lands across much of the range of Lesser Prairie-Chickens in recent years. U.S. Department of Agriculture policy for emergency drought conditions does require half of a CRP field remain unhayed, or, if grazed, stocking rates are reduced to 75% of NRCS rates. The land use policies ensure that at least some vegetative cover remains from year to year. However, declarations of emergency drought that open CRP lands to emergency haying and grazing in consecutive years may prove to be problematic for maintaining suitable habitat conditions.

Similar to fire, direct impacts of livestock grazing on the Lesser Prairie-Chicken have not been well quantified. Yet, because we have ample information regarding how grazing impacts vegetation characteristics and the habitat requirements of Lesser Prairie-Chickens for different life stages, we can link existing data to form predictions regarding grazing impacts specific to Lesser Prairie-Chickens. Specifically, Lesser Prairie-Chickens require some level of residual cover for nesting, with forb composition and an open understory structure necessary for brooding (Hagen et al. 2004). Thus, stocking rates of livestock grazing that lead to optimal habitat conditions would be favorable to Lesser Prairie-Chickens at the scale of management. Deviation from those requirements would be unfavorable for Lesser Prairie-Chicken management. If pastures are heavily stocked with livestock in relation to vegetation production, residual cover will be low across the landscape. Conversely, when landscapes are lightly stocked with livestock relative to vegetation production during wet periods, residual cover will increase. Therefore, stocking rates should be closely monitored and adjusted as needed, regardless of the grazing system utilized, if maintaining or increasing Lesser Prairie-Chickens is a management goal.

Recreation

The Lesser Prairie-Chicken is a highly desirable species for purposes of outdoor recreation. Bird-watchers, photographers, and hunters seek opportunities to view displaying birds at leks in the spring and harvest prairie grouse in the fall hunting season. As the species has become more range restricted and less abundant, demand has concentrated and perhaps increased for some recreational uses.

The Lesser Prairie-Chicken is listed as a game species in Kansas, New Mexico, Oklahoma, and Texas. However, until federal listing as a threatened species, the species was hunted only in Kansas because all other states had previously closed their hunting seasons (Chapter 7, this volume). Harvest for Lesser Prairie-Chickens will remain closed as long as the species is federally listed as a threatened species. Despite a small number of hunters who pursued the Lesser Prairie-Chicken in Kansas (200–1,200 annually) and a limited harvest, the species did offer a specialty form of recreation for upland bird hunters (Dahlgren 2012). The vast majority of all Lesser Prairie-Chickens harvested in Kansas were on private lands or private lands open to the public through lease agreements under a state program for Walk-in Hunting Access (WIHA). Kansas has an extensive walk-in hunting program and hunting was not highly concentrated, reducing the likelihood of high levels of take from individual populations of the Lesser Prairie-Chicken. Similar to Kansas, virtually all historical harvest of Lesser Prairie-Chickens in Oklahoma and Texas was on private lands because limited public lands that support Lesser Prairie-Chicken. Only in New Mexico do substantial numbers of Lesser Prairie-Chickens occur on public lands, which could allow for Lesser Prairie-Chicken public access if hunting was again allowed within that state.

Wildlife viewing and photography of Lesser Prairie-Chickens is typically focused during the breeding season when males display at leks (Chapter 13, this volume). The predictability of traditional lek sites, charismatic display behaviors, and behavioral tolerance of the birds to disturbance from viewing blinds make prairie-chicken viewing a desirable form of recreation. Some level of Lesser Prairie-Chicken viewing and photography takes places in all five states where the species occurs. The Cimarron National Grassland in Kansas previously provided two blinds located on Lesser Prairie-Chicken leks that are available on a first-come, first-served basis. The Comanche National Grassland in Colorado traditionally had a blind located on a lek of Lesser Prairie-Chickens, but the facility was recently closed to the public. New Mexico, Oklahoma, and Texas currently have no public viewing opportunities for Lesser Prairie-Chickens. However, private opportunities exist in all states. Specifically, Oklahoma and New Mexico each hold a Lesser Prairie-Chicken festival in April. Private landowners in Colorado, Oklahoma, and Texas additionally offer fee-based opportunities to view Lesser Prairie-Chickens.

Listing of the Lesser Prairie-Chicken as a threatened species may reduce recreational activities. Harvest opportunity has ceased following the federal listing in 2014. Listing could potentially increase public demand for viewing opportunities, while decreasing access on public lands because of potential for negative impacts. Recreational use could provide additional income opportunities for private landowners who allow viewing of Lesser Prairie-Chickens. Alternatively, some landowners fearful of the perceived or real implications of federal listing may limit public access for viewing opportunities.

Energy Development

Industrial development of grasslands has the potential to impact Lesser Prairie-Chickens because of installation of vertical structures, noise, vehicle traffic, and loss of vegetation cover (Figure 10.3). Limited data indicate that energy development can cause change in behavior of Lesser Prairie-Chickens (Pitman et al. 2005, Pruett et al. 2009, Hagen et al. 2011). If energy development is determined to result in take under the ESA, then it could be restricted or modified in certain areas where Lesser Prairie-Chickens occur. Many areas of the federal lands are already either developed for energy production or have lease agreements in place. Additionally, federal lands such as BLM and USFS already have restrictions in place to limit energy extraction impacts to the Lesser Prairie-Chicken (BLM 2008, USFS 2014). The Cimarron and Comanche National Grasslands have specific guidelines relative to energy development including the following: turbines and power lines will be located outside Lesser Prairie-Chicken habitat, transmission lines will be buried, existing corridors will be used, development will be focused in areas already developed that are outside Lesser Prairie-Chicken habitat, no oil and gas surface occupancy within 3.2 km of any leks of Lesser Prairie-Chickens that have been active since 2003, and must minimize new surface disturbance (USFS 2014). Further, the BLM has the following guidelines in place for the 23,472 ha Lesser Prairie-Chicken Habitat

Figure 10.3. Industrial development of native grasslands can cause habitat fragmentation that may impact Lesser Prairie-Chickens. Public and private lands are under increasing pressure for energy development of oil, gas, and renewable resources. (Photo courtesy of R. Dwayne Elmore, Oklahoma State University.)

Preservation Area of Critical Environmental Concern (ACEC): The ACEC will be closed to future oil and gas leasing; the ACEC will be closed to locatable, leaseable, and salable mineral entry; existing oil and gas leases will be developed in accordance with those prescriptions applicable in the Core Management Area and sand dune lizard habitat; and vegetation will be managed to meet the goals of the ACEC (BLM 2008).

The ownership of mineral rights by state agencies varies, but many state-owned lands have severed mineral rights from surface ownership. Thus, the agency itself has little control over energy development. However, should the Lesser Prairie-Chicken be listed under the ESA, energy companies would be required to comply with any ESA restrictions on state-owned lands. Currently, multiple energy companies are in the process of drafting Habitat Conservation Plans under Section 10 of the ESA with the USFWS that will guide development to minimize impacts to Lesser Prairie-Chickens.

Energy development pressure is similar on both public and private lands, but private landowners may be disproportionately affected by development restrictions. Impacts could be either positive or negative depending on their land management objectives and whether they hold mineral and wind rights. For instance, if a landowner wishes to capitalize on mineral rights, restrictions may be viewed as an impediment to such development in areas where Lesser Prairie-Chickens occur. However, this may be more of a perception than reality because steps could likely be taken to mitigate potential take. However, if a landowner does not maintain mineral rights, restrictions could be viewed positively because they might minimize surface disturbance. Wind rights are typically held by the landowner. If restrictions are put in place with regard to fossil fuel or renewable energy development, it will encourage state and federal agencies to create incentive programs or mitigation strategies such that landowners restricted from development are compensated for the ecological values their land provides to society while offsetting any loss of potential economic gains from development. Mitigation banking and alternative methods can provide the necessary tools to create incentive programs.

Management and Uses Summary

Fire, mechanical, and herbicide means are used to manage woody vegetation for the Lesser Prairie-Chicken. However, some level of

shrub cover appears to be important for Lesser Prairie-Chickens, especially in western portions of their range where shrub eradication may be detrimental to Lesser Prairie-Chickens. Managers often attempt to balance woody plant and herbaceous cover for both livestock and Lesser Prairie-Chickens simultaneously. On private lands, many cost-share programs are available to assist landowners in managing desirable and undesirable species of woody plants relative to the Lesser Prairie-Chicken. Livestock grazing is practiced over most of the range of the species, but appropriate stocking rates are necessary to ensure adequate residual nesting and winter cover for Lesser Prairie-Chickens. In a region so characterized by annual variation in grass production, maintaining appropriate livestock stocking rates is challenging and grasslands are often improperly stocked on both private and public lands. Hunting is currently unavailable for the Lesser Prairie-Chicken, but wildlife viewing opportunities are in moderate demand. Recreational use creates some incentives for private landowners to manage for Lesser Prairie-Chickens.

SUMMARY

Most of the area within the current range of the Lesser Prairie-Chicken is in private ownership (~94%) that varies in habitat suitability. Further, the majority of Lesser Prairie-Chickens occur on these private lands. Incentive-based programs will therefore be critical for the conservation of this species and several state and federal programs are currently available to private landowners. The Conservation Reserve Program is arguably one of the more important federal programs in regard to conservation of Lesser Prairie-Chickens, but has been greatly reduced in recent years because of federal policy changes. Increasing area caps for counties that support populations of Lesser Prairie-Chickens is needed to ensure adequate habitat for this species. Directed conservation policy for Lesser Prairie-Chickens from state and federal stakeholders will be necessary to continue and expand incentive programs on private lands, while ensuring that public lands are managed for the benefit of Lesser Prairie-Chickens. Despite the fact that most Lesser Prairie-Chickens occur on private lands, public lands could serve as core areas to ensure stability among regional populations of Lesser Prairie-Chicken and provide a reference point for best practices for conservation efforts on adjacent private lands. Public lands provide higher levels of assurance of long-term Lesser Prairie-Chicken habitat suitability and are important for ESA decisions and recovery planning. Livestock grazing is an important activity within the region on public and private lands where Lesser Prairie-Chickens occur and will likely continue into the foreseeable future. Grazing can be a compatible practice with population viability of Lesser Prairie-Chickens, but consideration should be given to habitat heterogeneity, residual cover, and fence construction. For example, stocking rates should be at a level so that each year, a portion of the area within each Lesser Prairie-Chicken population has sufficient grass height at the beginning of the nesting season to accommodate nesting females. Fire is a critical process in grassland ecology. The suppression of fire has led to woody plant encroachment in many areas, which is a primary driver of regional Lesser Prairie-Chicken declines in some areas. Incentives must be increased to encourage fire on private lands and policy must be streamlined on public lands to enable managers to carry out needed practices. Last, energy extraction is important to local economies within the Southern Great Plains and to the national energy portfolio of the United States. Careful planning is needed to ensure that continuing industrial development of native grasslands does not impede the recovery of Lesser Prairie-Chickens.

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