

**Abstract for the
Lesser Prairie-Chicken and Wind Energy Map
by Playa Lakes Joint Venture
Version 2**

Purpose: The purpose of this map is two-fold. First, it is meant to provide wind industry professionals, and others interested in the conservation of the Lesser Prairie-Chickens (LEPC), initial insight into where development of wind farms and their associated infrastructure may have negative impacts on this species of high conservation concern. Second, this map also serves to show areas where mitigation projects resulting from wind farm development may be most beneficial for this species, again from a broad perspective. Wind industry professionals and consultants should always contact and seek recommendations from statutorily responsible state and federal natural resource agencies prior to finalizing wind power development and mitigation plans, since site-specific conditions may vary.

Description: There are four components to the map. First, the map depicts the historical range of the LEPC to illustrate the once expansive range. Second, it illustrates what is considered the current range of LEPC, encompassing areas where LEPC are known to occur or have occurred in recent years. Next, the map highlights core habitat patches, large areas of suitable habitat with low fragmentation (see Method for more details), located within or up to 10-miles outside the current range. Core Habitat patches are areas where wind farm development may have the greatest likelihood of impacting LEPC by disturbing LEPCs in occupied areas or degrading suitable but unoccupied habitat that is necessary for the recovery of the species (i.e., making it less suitable or unsuitable for future LEPC occupancy). Additionally, the map highlights areas near these core habitat patches that, although more fragmented, are likely suitable habitat areas where habitat conservation is not only important for the recovery LEPC but these buffering areas are where LEPC may benefit most from mitigation projects resulting from wind farm development (see Methods for more details). We refer to these areas as Core Buffer Habitat.

Methods:

- Historic range boundary – We used the historical boundary of LEPC as illustrated and described in detail in the Lesser Prairie-Chicken Conservation Initiative (Davis et al. 2008), a product of the LEPC Interstate Working Group, and modified (expanded) this boundary in Colorado to incorporate recent edits from the Colorado Division of Wildlife (per. comm. Seth McClean).
- Current range boundary – This boundary was created by the Lesser Prairie-Chicken Interstate Working Group, which is a partnership of biologists representing natural resource agencies and organizations from the five states within the LEPC range (Colorado, Kansas, New Mexico, Oklahoma and Texas). This boundary includes areas where LEPC area known to occur or have occurred in recent year; however, it is almost certain that not all occupied areas are known, so LEPCs likely occur in areas outside this boundary.

- **Core Habitat** – We defined core habitat as patches of suitable habitat (mixed grass prairie, sandhills prairie, tallgrass prairie, sand sagebrush or shinnery) that are: 1) either more than 2,000ha in area or 500ha – 2,000ha in area and no more than 10km from another patch of at least 500ha (i.e., patches with high connectivity), 2) at least 1600m wide (about 1 mile), and 3) contain gaps of unsuitable habitat no wider than 450m (about 0.25 mile). Minimum patch size criteria, as stated in 1), follow recommendations published in *Guidelines for managing Lesser Prairie-Chicken populations and their habitats* (Hagen et al. 2004). Minimum patch width and maximum gap width within patches were based on expert opinion as we found no information in the literature that specifically addresses these thresholds. To identify core habitat patches we used PatchMorph (Girvetz 2007), “an improved patch delineation algorithm ... which can delineate patches across a range of spatial scales based on three organism-specific thresholds: (1) land cover density threshold, (2) habitat gap maximum thickness (gap threshold) and (3) habitat patch minimum thickness (spur threshold).” PatchMorph is an extension for ESRI ArcMap (ESRI 2005) and its function and application are published in *Landscape Ecology* (Girvetz and Greco 2007). We applied the PatchMorph algorithm to a seamless landcover layer, developed by Playa Lakes Joint Venture (PLJV), which encompasses all five states in the LEPC range. This landcover categorizes habitats according to a single classification scheme such that habitats are consistent across state boundaries. We ran the analysis within and 10-miles outside of the current LEPC range to account for potential geographic error that may have occurred during delineation of the current range (i.e., the current range is not a true envelope of LEPC sightings but was ‘blurred’ to protect LEPC lek locations).
- **Core Buffer Habitat** – We defined core buffer habitat as an area of 2,025ha in which there is at least 810ha of suitable habitat (mixed grass prairie, sandhills prairie, tallgrass prairie, sand sagebrush or shinnery), no more than 810ha of cropland, 50ha of mesquite, and no urban/suburban development or major roads (e.g., state highways, interstates, freeways; secondary roads such as county roads not included). These criteria are based on recommendations from the LEPC Interstate Working Group in combination with recommendations found in Hagen et al. (2004). Generally speaking, core buffer habitat contains areas of suitable habitat that are smaller and less contiguous relative to the core habitat patches and have more diverse landcover composition (i.e., a mix of both suitable and unsuitable habitats). We located core buffer habitat using a moving window analysis of the seamless landcover mentioned above in ERDAS IMAGINE Modeler (Leica 2006).

Limitations: The data illustrated in this map are limited by the quality of their underlying source data. Both LEPC range boundaries are based on expert knowledge of LEPC occurrence but their true accuracy is unknown. Identification of core habitat patches and core buffer habitat is limited by both the appropriateness of criteria applied to the spatial analyses as well as the accuracy of the landcover on which these analyses were performed. An accuracy assessment of the PLJV landcover has not yet been conducted

so its accuracy is unknown; however, information on the accuracy of the source data (e.g., state GAP layers) for the PLJV landcover is available upon request.

Restrictions: This map and the associated data layers are intended as general guidelines to consider when exploring the potential impact of wind energy development on LEPC. PLJV does not promote this map as definitive in locating LEPC occurrence, its habitat, or measuring potential impacts from wind energy development. This map may be revised as new and better data or analyses are available. When using this map or its associated data layers, please cite Playa Lakes Joint Venture and the authors of the LEPC boundaries.

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