

**Appendix 1.** Originally we used the National Land cover Database (NLCD) for all five states, calculating percent of the area around a pixel that was shrubland, percent grassland/ herbaceous, and percent pasture/ hay. These vegetation data, however, resulted in what was agreed as great over-prediction in the southwest driven by the NLCD shrubland classification including large expanses of unused vegetation. Texas had recently developed a new land cover, Ecological Mapping Systems of Texas for Texas (Elliot et al. 2014), which was thought to be more accurate for the region than the NLCD. For New Mexico the most accurate land cover was believed to be the Southwest Regional Gap Land Cover Dataset. Cover categories were selected by each state’s biologists as known used or suspected used (included below) with other categories assumed as unused. Lek location data were examined in relation to the vegetation categories along with biological knowledge.

Table A1.1. Land cover classes in the National Land Cover Dataset for Colorado, Kansas, and Oklahoma.

Class	Area (ha)
Shrubland (Dwarf Scrub and Shrub/ Scrub)	703,436
Grassland/ Herbaceous	7,350,080
Pasture/ Hay	233,199

Table A1.2. Classes included from the Southwest Regional Gap Land Cover for New Mexico.

Class	Area (ha)
Apacherian-Chihuahuan Mesquite Upland Scrub	1,156,120
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe	549,528
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	627,038
Chihuahuan Gypsophilous Grassland and Steppe	4,784
Chihuahuan Mixed Salt Desert Scrub	29,570
Chihuahuan Sandy Plains Semi-Desert Grassland	14,432
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	11,946
Chihuahuan Succulent Desert Scrub	447
Coahuilan Chaparral	8,064
Colorado Plateau Mixed Low Sagebrush Shrubland	217
Inter-Mountain Basins Montane Sagebrush Steppe	160
Inter-Mountain Basins Semi-Desert Grassland	715
Inter-Mountain Basins Semi-Desert Shrub Steppe	67,798
Madrean Juniper Savanna	15,304
Mogollon Chaparral	4,001
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	3,168
Rocky Mountain Lower Montane-Foothill Shrubland	7,100
Southern Rocky Mountain Juniper Woodland and Savanna	37,141
Southern Rocky Mountain Montane-Subalpine Grassland	875
Western Great Plains Foothill and Piedmont Grassland	448
Western Great Plains Mesquite Woodland and Shrubland	108,558
Western Great Plains Shortgrass Prairie	2,470,784

Table A1.3. Classes from the Ecological Mapping Systems of Texas for Texas.

Class	Area (ha)
CRP / Other Improved Grasslands	2,341,747
High Plains: Sand Prairie	310,563
High Plains: Sandhill Shinnery Duneland	35,312
High Plains: Sandy Deciduous Shrubland	195,982
High Plains: Sandy Shinnery Shrubland	35,232
High Plains: Shortgrass Prairie	963,522
Native Invasive: Deciduous Shrubland	52,794
Native Invasive: Sand Sage Shrubland	459,313
Rolling Plains: Mixed Grass Prairie	840