THE RELATIONSHIP BETWEEN GRASSLANDS, CONSERVATION RESERVE PROGRAM (CRP) ENROLLMENTS, AND GREATER PRAIRIE-CHICKEN *(TYMPANUCHUS CUPIDO PINNATUS)* POPULATIONS IN MINNESOTA

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ABSTRACT

We quantified greater prairie-chicken (*Tympanuchus cupido pinnatus*) population responses to CRP enrollments using population indices (males/lek and leks/km^2) derived through annual monitoring efforts in Minnesota. We quantified land cover during the period 2004–2016 in survey blocks where systematic greater prairie-chicken surveys were conducted during the same period to evaluate the contribution of CRP enrollments to available grassland cover and estimate changes through time. We also evaluated existing vegetation characteristics of grassland CRP conservation program practices to assess how different CRP management strategies were related to greater prairie-chicken abundance and lek persistence. The best-supported model of lek density (leks/km^2) included the area of CRP grasslands and wetlands; state-, federal-, and The Nature Conservancy (TNC)-managed grasslands and wetlands; and the area of "other" wetlands; the contiguity of grasslands; and the number of patches of grasslands and wetlands in each survey block. The best-supported model of the number of males/lek included the amount of CRP grassland and wetlands; state-, federal-, and TNC-managed grasslands and wetlands; and "other" wetlands; forests; developed areas; shrubs; and the contiguity of CRP grassland. These results suggest that increasing the quantity of grassland and wetland CRP contracts throughout the existing range of greater prairie-chickens in northwestern Minnesota and aggregating CRP grassland contracts in areas of known lek sites may increase greater prairie-chicken abundance. We also simulated the impact of 1) allowing CRP enrollments to expire, 2) adding CRP enrollments randomly in 1-acre blocks, and 3) adding 20-acre CRP enrollments strategically to increase contiguity. Our simulations indicated that lek density would decline by an average of 22% (2-80%) in the survey blocks and males/lek would decline by an average of 7% (0-19%) at the lek scale if CRP were allowed to expire. Greater losses occurred in areas where CRP comprised a larger component of the landscape. Comparisons between random additions and strategic additions of CRP enrollments revealed that strategic additions produced greater gains, and sometimes adding CRP randomly provided no benefit for greater prairie-chickens when contiguity decreased. Lastly, we examined vegetation characteristics associated with high-quality greater prairie-chicken breeding habitat. Many combinations of CRP contract type, age of planting, and soil type provided appropriate vegetation structure and composition for greater prairie-chickens, including low diversity introduced grass species. Our results provide guidance to the Farm Service Agency (FSA) and other organizations in targeting conservation programs in areas where they will be most effective for greater prairie-chickens.

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