Modeling Black-Tailed Prairie Dog Habitats in Kansas.

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Objectives

Over the past century, the number of black-tailed prairie dogs in Kansas has decreased significantly. The population decline of the species is due to both natural and human-induced threats, including bubonic plague, an increase in predators, unregulated hunting, and the conversion of native grasslands to other types of land cover.

It is necessary to identify current black-tailed prairie dog habitats and areas suitable for habitat in order to protect the species and to prevent future population declines.

The objective of this project is to model areas suitable for black-tailed prairie dog habitation in Kansas.

Habitat Suitability for Black-Tailed Prairie Dogs

Number of Models Predicting "Presence"

0 1 2 3 4 5 6 7 8 9 10

Methods

The Genetic Algorithm for Rule-Set Prediction (GARP), software used for modeling potential species habitats, and Geographic Information Systems (GIS) were used to model habitat potential for black-tailed prairie dogs in Kansas.

Environmental variables included in the modeling were Normalized Difference Vegetation Index (NDVI) layers for the spring, summer, and fall growing seasons (March through October), soil texture, soil depth to bedrock, and slope. NDVI layers were derived from 2001 MODIS 250-m satellite imagery.

SSURGO data were the sources for the soil texture and soil depth to bedrock layers. Slope was calculated from 30-m digital elevation models (DEMs). Training data sample points were selected from an aerial survey of prairie dog colonies by the Kansas Department of Wildlife and Parks (KDWP).

Land cover types deemed unsuitable for black-tailed prairie dog habitat were masked out by the Kansas GAP land cover map prior to the GARP modeling.
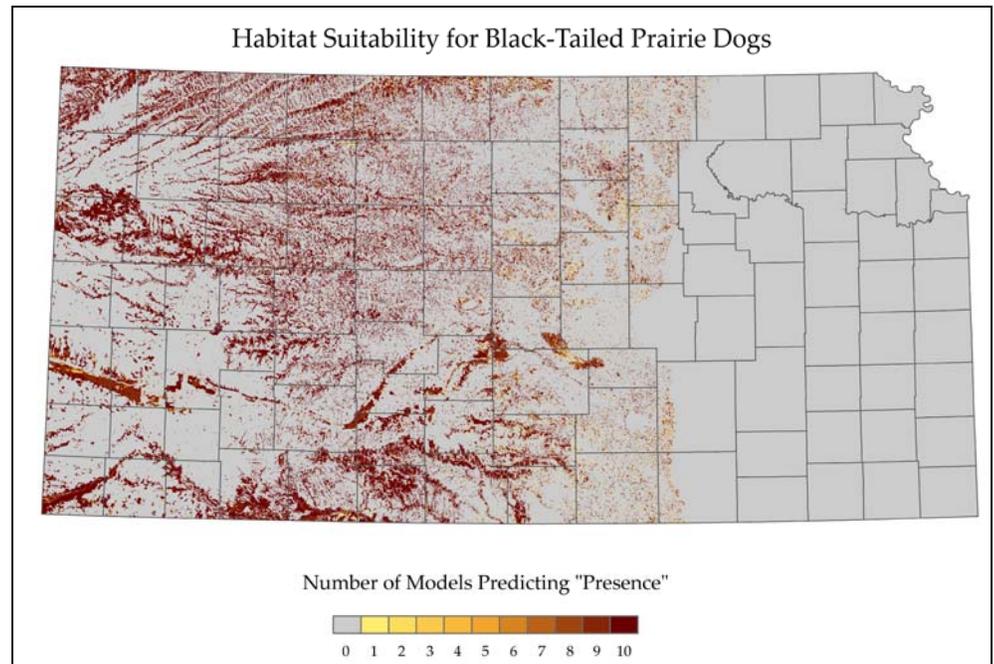
Results

GARP generated several habitat models, each model predicting areas of presence and absence of prairie dog habitats. Using a portion of the training sample points for testing the models, GARP selected the "ten best models," which were combined to create the final prairie dog habitat suitability map. The map depicts a range of values; values of 10 indicate that all ten models predicted presence (high habitat suitability) while values of 0 indicate that all models predicted absence (low habitat suitability).

Significance

The results of this project have the potential to help state agencies and organizations, including the Kansas Black-Tailed Prairie Dog Working Group and KDWP, in their efforts to protect black-tailed prairie dog habitats in the state. By identifying areas with high suitability for black-tailed prairie habitat, efforts may focus on ways to protect current prairie dog populations in these places.

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