

Modeling the Effects of Climate and Land Use Change on Crucial Wildlife Habitat

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Changing temperature and precipitation patterns in the South Central U.S. pose short and long term challenges for wildlife managers. Planning for an uncertain climate future requires tools that give managers the power to visualize the species-specific impacts of potential future climate scenarios. In a recently completed project funded by the South Central CSC, researchers at New Mexico State University, the New Mexico Cooperative Fish and Wildlife

Research Unit, and NOAA's Geophysical Fluid Dynamics Laboratory responded to this data need. They compared what is known about the climate needs of 20 key species with future climate projections. Through this process, researchers assessed the vulnerability of these species to climate variability.

The 20 species assessed in this study, including the black-tailed prairie dog and the lesser prairie-chicken, were selected according to several criteria, including their expected sensitivity to climatic change. Researchers examined where these species currently occur in order to better understand the environmental, especially climate, conditions necessary for their survival. Climate and land use change projections for 2050 and 2070 were used to assess the potential future distributions of conditions suitable for these species.

For each species studied, the researchers produced climate suitability maps under two different climate scenarios and on two different timescales. The maps are green where climate conditions are suitable for the species both now and in the future, red where currently suitable conditions are expected to become unsuitable, and yellow where the species might gain suitable habitat.

Key Species-Specific Insights

From the data they gathered and synthesized, the researchers concluded that:

- **Lesser prairie chickens** could lose an average 63% of their habitat under the studied scenarios, with minimal gains to compensate for this loss.
- **Cassin's sparrow** is the only one of the 9 bird species studied to have more than a 50% gain in suitable climate conditions for all future climate scenarios.
- **Quails** are more affected than any of the other birds studied. In most scenarios, quails lose more climatically suitable habitat that they gain.
- **Black-tailed prairie dog, swift fox, and Gunnison's prairie dog** all showed more gain than loss of climatically suitable habitat for all scenarios studied.

Incorporating Climatic Suitability Models into the New Mexico Critical Habitat Assessment Tool

These maps have been incorporated into the publicly accessible New Mexico state-level CHAT (Crucial Habitat Assessment Tool). CHATs are being used by the states across the western U.S. to facilitate conservation and project planning and are useful to decision-makers at all levels of government. Incorporating information about the potential impact of climate and land use change on species distributions into this tool ensures the accessibility of this crucial information.