



United States Department of Agriculture – Forest Service

Rocky Mountain Research Station



Analysis of Potential Impacts of Climate Change on Wildlife Habitats in the U.S.

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Background: Consensus about the nature and extent of climate change is beginning to emerge among atmospheric scientists and there is little contention that the global climate is now undergoing a period of change and is likely to continue to change. The complex feedbacks between climate, land use, land cover, and biodiversity have foiled any general prediction of how wildlife may respond to future climate. To address these changes, State wildlife agencies will need information and analyses that provide insights on the magnitude of the climate change impact on wildlife habitats and some tenable options for ameliorating those impacts.

Objectives: Our study will:

- synthesize information from the scientific literature on climate change,
- quantify the stress on terrestrial wildlife habitats from predicted changes in climate and vegetation, and
- review management addressing climate change in State Wildlife Action Plans.

The bibliographic database will capture the current knowledge of habitat impacts and climate change. Our empirical analysis will focus on stress under climate change, attributed to changes in temperature and precipitation, habitat area losses, declines in habitat quality (via productivity estimates), wildlife movement constraints, and proportions of the terrestrial vertebrates that are imperiled. This stress index, ranking areas within the US from high to low stress, will be used to select three high-stress states for more detailed analysis. The study will close with an analysis of the management recommendations proposed in the three states' Wildlife Action Plans, and identify management options available to minimize climate change impacts to habitat and species.

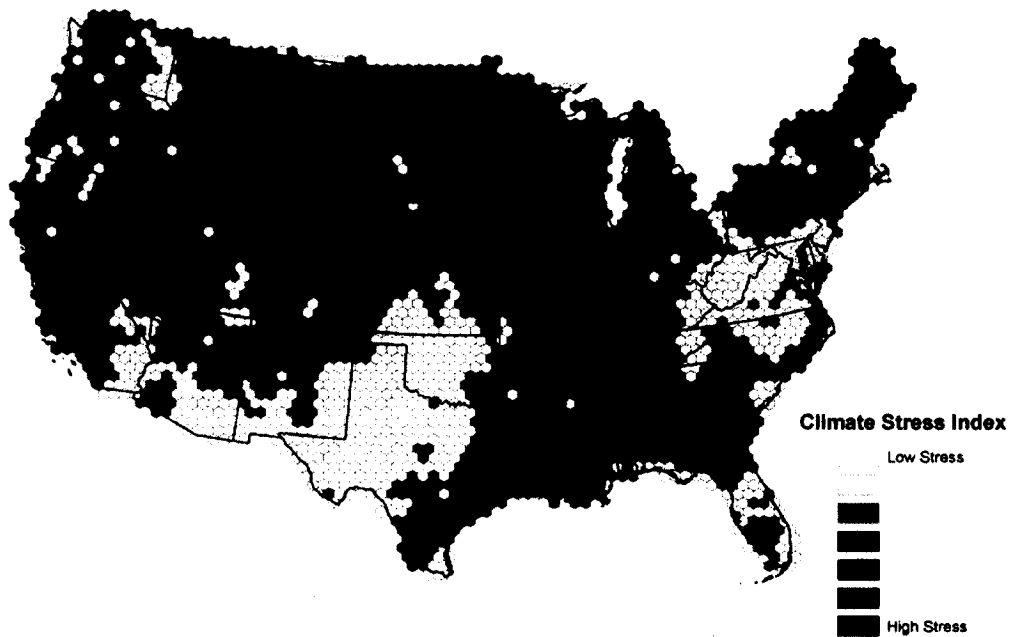
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Results: Rather than mapping the ranges of individual species, the potential stress of climate change on terrestrial wildlife can also be evaluated by quantifying the degree to which climate regimes at a particular locale are projected to change. Our approach assumes that the greater the projected climate regime shift (as measured by a comparison of the historical and future temperature, precipitation, and productivity), the greater the stress on wildlife. We have recently mapped areas of the contiguous U.S. along a gradient of relatively low to high climate stress (Fig. 1).

(a)



(b)

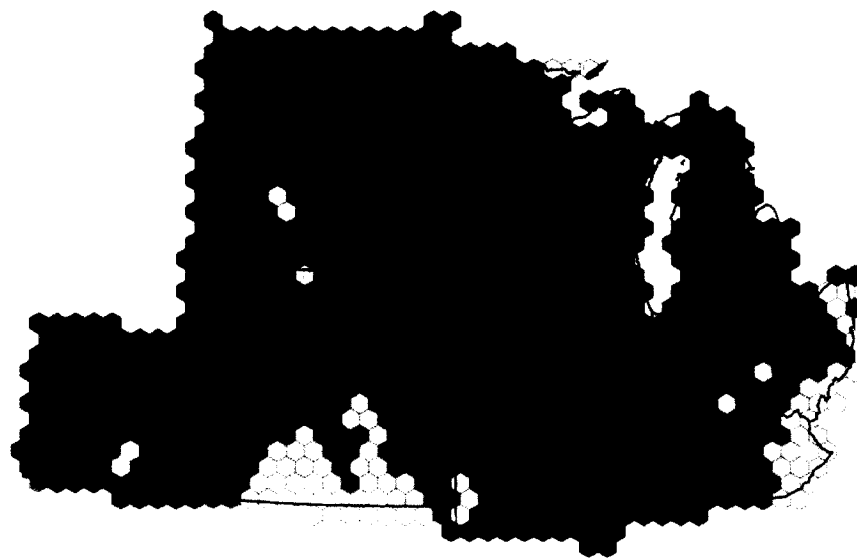


Figure 1. Relative climate stress (high=dark blue; low=pale yellow) as measured by the degree of change in temperature, precipitation, productivity, and vegetation shifts between the recent historical and future climate regime. (a) Climate stress for the coterminous U.S.; (b) Climate stress for the member states of the Midwest Association of Fish and Wildlife Agencies.