

Climate Change and Biodiversity in California: predictions for changes in animal communities and the location of priority areas

Judsen Bruzgul
Department of Biological Sciences, Stanford University

Research Summary

California is home to hundreds of animals, some of which are not found anywhere else in the world. As the climate in California changes over the next century, the animals are likely to respond in different ways, and the current strategies for preserving California's important animal diversity may no longer be as effective. This could easily result in animal extinctions. This project contains three related steps meant to provide guidance for California conservation planners and policy makers charged with designing effective conservation strategies in the face of rapid climate change. The first step will be to develop a detailed understanding of where California's animal diversity is today, with particular attention to both individual animals, and also the unique combination of animals found in communities throughout the state. These areas with unique animal communities will be important conservation targets where planners can potentially protect many animals and the natural function of the ecosystem, due to the resilience provided by functional diversity and species interactions. In the second step of the project, I will use well-tested models to generate specific predictions about how animals will respond to different climate change scenarios. In some cases, the predicted direction of animal movement will coincide with places that are heavily used by people; this will likely have severe consequences for the natural ability of animals to respond to the changing climate. Identifying the locations where animal response to climate change and human activities are likely to be in strong conflict can help planners focus limited resources on those areas where they are most needed. The final step will be to compare the results from the first section—where animals are today—with results from the second—where they are likely to be after climate change—to understand what climate change will mean for California's animals. I will pay particular attention to whether the unique animal communities identified in the first step remain together or if as animals move in different directions they will be pulled apart by climate change, and whether new, unique communities are likely to arise. Taken together, my results will provide detailed information about where California's animal diversity is likely to move because of climate change and will identify locations where policy action will be needed to promote animals' natural ability to respond to the changing climate. These products will provide policy makers with information that will help in the design of better conservation plans to maintain California's unique animal diversity and to enhance California's overall environmental quality.