



The Science Behind Audubon's Climate Change Analysis

Audubon scientists linked several decades of recorded climate data with observations from the Audubon Christmas Bird Count and the North American Breeding Bird Survey to create models that characterize historic summer and winter ranges for 314 species using 17 climate variables:

Annual Mean Temperature (°C)
Mean Diurnal Range (Mean of monthly [maximum temperature - minimum temperature]) (°C)
Isothermality (Mean Diurnal Temperature Range/Temperature Annual Range)
Maximum Temperature of Warmest Month (°C)
Minimum Temperature of Coldest Month (°C)
Temperature Annual Range (°C)
Mean Temperature of Wettest Quarter (°C)
Mean Temperature of Driest Quarter (°C)
Mean Temperature of Warmest Quarter (°C)
Mean Temperature of Coldest Quarter (°C)
Annual Precipitation (mm)
Precipitation of Wettest Month (mm)
Precipitation of Driest Month (mm)
Precipitation of Wettest Quarter (mm)
Precipitation of Driest Quarter (mm)
Precipitation of Warmest Quarter (mm)
Precipitation of Coldest Quarter (mm)

These models define the “climate niche” within which each species has been observed for decades, and when used in tandem with predictions of future conditions from Global Climate Models, areas with suitable climate to support each species in the future can be defined.

Overall Results: 314 of the 588 species studied are predicted to lose more than 50% of their current range by 2080. Of these 314 species, 126 would lose more than 50% of their current range by 2050.

Birds that would be impacted in Colorado:

- **27 Climate endangered species** (9 passerines, 9 ducks, 7 raptors, and 2 gulls), which have a projected loss of >50% of their current range by 2050 across all scenarios, with no net gain from range expansion; these are species that need our help in their current locations.
- **23 Climate threatened species** (18 passerines, 3 ducks, 1 raptor, and one game bird), which have a projected loss of >50% of their current range by 2080 across all scenarios with possible net gain from range expansion. These species also need help where they are, but also in the places where they are expected to be based on projected future conditions, so they can shift their ranges and survive.

The species list that follows is categorized by climate status and species type, and includes a summary of projected climate effects on each species range, overall and for Colorado.

Learn more about the Audubon Climate Report <http://climate.audubon.org/>
Learn more about how to get involved through Audubon Rockies <http://rockies.audubon.org/>