Background

The Colorado Climate Report is a synthesis of climate change science important for Colorado’s water supply. The report was commissioned by the Colorado Water Conservation Board in support of Governor Ritter’s Colorado Climate Action Plan. It focuses on observed trends, modeling, and projections of temperature, precipitation, snowpack, and runoff. The report summarizes Colorado-specific findings from peer-reviewed regional studies, and presents new graphics derived from existing datasets. The state is home to many experts in climate and hydrology, and this report also draws from ongoing work by these scientists.

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Assessment Findings

Models, Scenarios, Projections. Global climate models do not represent the complexity of Colorado’s topography. Researchers use models specifically designed for Colorado’s topography to project future changes in climate and water resources.

In Colorado, temperatures have increased by approximately 2°F between 1977 and 2006. Increasing temperatures are affecting the state’s water resources.

Lessons Learned & Future Directions

Climate change will affect Colorado’s use and distribution of water. Water managers and planners currently face specific challenges that may be further exacerbated by projected climate change.

Climate models project Colorado will warm by 2.5°F by 2050 and 4°F by 2080, relative to the 1980-89 baseline (Figure 1). Mid-21st century summer temperatures on the Eastern Plains of Colorado are projected to shift westward and upward, bringing into the Front Range temperature regimes that today occur near the Kansas border.

Separate climate models are projected to warn more than once. Projections suggest that typical summer monthly temperatures will be as warm or warmer than the hottest 10% of summers that occurred between 1930 and 1999 (Figure 2).

Between 1978 and 2004, the spring pulse in Colorado shifted earlier by about two weeks. Several studies suggest that shifts in timing and intensity of snowmelt are related to warming spring temperatures. The timing of runoff is projected to shift earlier in the spring, and late-spring flows may be reduced.

Recent hydrology projections suggest declining runoff for most of Colorado’s river basins in the 21st century. However, the impact of climate change on runoff in the Rio Grande, Platte, and Arkansas River basins is not as well studied as is that of the Colorado River Basin. The Upper Colorado River Basin, multimodel average projections suggest decreases in runoff ranging from 5% to 20% by 2050, compared to the 20th century average (Figure 3).

Lessons Learned & Future Directions

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For providing information on the potential impacts of climate change on water resources, the report includes examples of how stakeholders have used climate information in decision making. Several of the report’s sections were added to help fill in the gaps of the corresponding chapters in the June 2007 Third National Climate Assessment (NCA). New information and new approaches to climate change communications are also included. The document highlights how different stakeholders have used climate information in decision making. In addition, the report includes information on the potential impacts of climate change on water resources, the report includes examples of how stakeholders have used climate information in decision making. The report includes examples of how stakeholders have used climate information in decision making. The report includes examples of how stakeholders have used climate information in decision making. The report includes examples of how stakeholders have used climate information in decision making. The report includes examples of how stakeholders have used climate information in decision making. The report includes examples of how stakeholders have used climate information in decision making.